DOCUMENT RESUME

ED 173 744 CS 004 708

AUTHOR	Evertson, Carolyn M.; And Others
TITLE	Texas Junior High School Study: Final Report of Process-Outcome Relationships. Volume I. R&D Report No. 4061.
INSTITUTION	Texas Univ., Austin. Research and Development Center for Teacher Education.
SPONS AGENCY	Michigan State Univ., East Lansing. Inst. for Research on Teaching.; National Inst. of Education (DHEW), Washington, D.C.
PUB DATE	[78]
CONTRACT	NIE-4-0-6-76-0073; OB-NIE-G-78-0116
NOTE	344p.; Tables may not reproduce well due to broken type; Volumes II and III are only available from the Center; For related documents, see CS 004 711-713
EDRS PRICE	MF01/PC14 Plus Postage.
DESCRIPTORS	*Classroom Research; *Effective Teaching; *English Instruction; Junior High Schools; *Mathematics Instruction; *Methods Research; Student Evaluation of Teacher Performance; *Teacher Evaluation

ABSTRACT

This is the first in a series of four reports describing a study of 1,614 junior high school mathematics and English students and 69 of their teachers that was undertaken to discover the effects of different teaching behaviors on cognitive and affective student outcomes. After describing the methodology in some detail, the document presents findings from high-inference measures for cognitive outcomes and includes extensive tables of data. This is followed by a discussion of findings from low-inference measures for cognitive outcomes that also includes tables of data and descriptions of student and teacher behaviors. A discussion of relations of high- and low-inference measures with student behaviors follows. The report includes a discussion of some of the implications of the study, a summary of the methods and procedures used for data collection and reduction, and the more important patterns of the results. (TJ)

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ED173744

Texas Junior High School Study:
Final Report of
Process-outcome Relationships
Volume I

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R&D Report No. 4061

(COET No. 78-1)

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CS004708

This study was supported in part by the National Institute of Education, Contract OB-NIE-G-78-0116, The Research and Development Center for Teacher Education. In addition, a portion of Dr. Brophy's time was supported by the National Institute of Education, Contract 4-0-6-76-0073, Institute for Research on Teaching, Michigan State University. The opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education and no official endorsement by that office should be inferred.

Footnotes

The authors wish to acknowledge and thank the following individuals who participated in the research described herein and/or the preparation of this report:

Jenny Bankhead, Dr. Michael Baum, Cynthia Coulter, Dr. John Crawford, Carol Dickerson, Donna Edgar, Janet Honea, Alex Landesco, Mary Jane Leahy, Nancy McMurtry, Linda Harris Rogers, Sharon Russell, Joseph Sauter, and Gael Sherman who observed in classrooms and helped prepare data for analyses.

John Brozovsky, Dr. John Crawford, Tom Linsley, Robert Morgan, and Dr. Donald Veldman who were involved in programming and statistical analyses.

Betty Ancheta, Carol Culp, Freddie Green, Karen Kington, Gwen Newman, Suzanne Rohrer, Elijah Udom, Debra Yarborough, and Sidney Weaver who assisted in manuscript preparation.

Julie Ballard, Beryle Bell, Molly Fernandez, Jesus Gaspar, Luis Gonzalez, Mary Jane Leahy, Teddie Melhart, Melvin Miller, Paul Persons, Kim Peterson, Norton Rosenthal, Debra Yarborough, and Ben Youngblood for assistance in report preparation.

Special recognition is extended to Dr. John Crawford, Cynthia Coulter, and Dr. Michael Baum who assumed major responsibilities during the planning, data collection, and data analyses phases of the project as a whole.

Also, we wish to thank several of our collegues who read and commented on parts of the final draft for their insightfulness and useful perspectives: Dr. Walter Doyle, Dr. Edmund T. Emmer, Dr. Thomas L. Good, and Dr. Donald Veldman.

Particular thanks go to Charles W. (Andy) Anderson who devoted much of his time and talent toward writing parts of the report and pulling together the efforts of several authors into a coherent manuscript. However, the authors take full responsibility for any errors or omissions.

CME
LMA
JEB

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This report presents the process-outcome relationships found in the data from the Texas Junior High School Study, conducted by the Correlates of Effective Teaching Program at the University of Texas Research and Development Center for Teacher Education. Both low- and high-inference measures of classroom processes and cognitive and affective indices of outcome will be discussed for two subject areas and for classrooms with varying levels of entering ability. Results describe patterns of teaching behaviors which relate to either type of outcome in different contexts, and may therefore suggest what composes "effective teaching" at the junior high school level. Although there has been some research on this topic at the elementary level, there has been no work done on teaching in the secondary schools that has included the large data base, variety of measures, and specification of contextual influences included in this study. These data were analyzed at the class level and focus only on process-outcome relationships. Other data will be presented in future reports, such as analyses done at the student level and examinations of presage-outcome, presage-process, and process-process relationships. Previous reports from this study have discussed the stability of and the contextual influences upon process measures (Evertson, Anderson, Edgar, Minter, and Brophy, Note 1).

Background. The Junior High School Study was conceived as a replication and extension of an earlier study of teaching effectiveness conducted at the second and third grade levels (Brophy and Evertson, 1976). The earlier study suggested several effective strategies for teaching elementary students, but it did not support several variables popular among educational researchers, such as indirect teaching, extensive use of class discussion, and pupil talk. One question arising from these results was that, even though such strategies were not related to achievement in the early grades, would they become more important at the later grades when most "tool" skills are mastered and students are learning to apply them? Another question was, to what extent do contextual influences, such as subject matter or the abilities of the students, affect such relationships? Therefore, the Junior High School Study was designed as an effort at replication of the earlier process-outcome study but at different grade levels, and also as a more extensive examination of teaching behaviors that were related to both cognitive and affective student outcomes.

The design was improved from that of the earlier study in several ways, including the following: 1) data were collected during the same school year in parallel sections of seventh- and eighth-grade mathematics or English classes taught by the same teachers in the same public schools; 2) 136 classrooms were visited alternately by two observers, each averaging 20 hours of observation per classroom; 3) data were collected on a large number of individual students, enabling investigations of student effects as well as teacher effects; and 4) the low-inference observational coding system was modified especially for use in secondary classrooms in order to capture appropriate contextual differences.

Methodology

Selection of subjects and design of instruments reflected the important research questions of the study. In all, 136 classes in nine schools were observed. They were chosen so that:

1. Two different but important school subject areas were included--math and English--making it possible to investigate differences in effective teaching strategies in different settings.

2. The nine junior high schools represented a wide range of

socio-economic status (SES) and achievement levels, making it possible to examine differences in effective teaching strategies for low vs. high ability classes.

3. Each participating teacher was observed in two separate sections of his or her subject matter (math or English), allowing systematic attention to the question of teacher stability in process behaviors across classroom settings, as well as to the central question of teaching effectiveness as it was affected by grade, subject matter, student sex, and other context differences.

Subjects

Description of teachers in the sample. Sixty-eight teachers (39 English and 29 math) were observed in nine of the eleven junior high schools in a large urban school district. (Two other junior high schools were not included because they were using an exclusively self-paced mathematics program that allowed for very little public teacher-student interaction.) Because two sections were observed for each teacher, there were 136 classrooms in all. Two observers alternated visits to these classes, throughout the school year 1974-1975. (The actual range was from 16 to 22 observations.) The following shows the distribution of observed math and English classes by grade levels:

Table 1.1

Distribution of Observed Math and English Classes by Grade Level

	Math	English	Total
7th Grade	31	44	75
8th Grade	27	34	61
Total	58	78	136

Note: Three teachers taught in both grades for math and two teachers taught in both grades for English.

The following table shows the distribution of teacher sex and ethnicity:

Table 1.2

Distribution of Teacher Sex and Ethnicity

Teacher Sex

	Math	English	Total
Male	11 (38%)	5 (13%)	16 (23%)
Female	18 (62%)	34 (87%)	52 (76%)
Total	29 (100%)	39 (100%)	68 (99%)

Teacher Ethnicity

	Math	English	Total
Anglo	25 (86%)	29 (74%)	54 (80%)
Mex. Amer.	0 (---)	7 (18%)	7 (10%)
Black	4 (14%)	3 (8%)	7 (10%)
Total	29 (100%)	39 (100%)	68 (100%)

Attempts were made to avoid unique situations by excluding unusual scheduling or split sections that met for part of the time before lunch and the remainder of the time after lunch.

Teachers selected for the study were those with at least one previous year of experience in their subject matter area. Student teachers, first-year teachers, or teachers who shifted into these areas from some other subject matter area were not included.

The resulting teacher sample was unusually complete, and was reasonably free of volunteer effects or other sample bias effects, since nearly all the eligible faculty from each of the nine junior high schools participated.

Description of students in the sample. The nine junior high schools represented a wide range of socio-economic status and achievement levels.

They were included in a local desegregation plan which provided for busing of black students only to predominantly white junior high schools. Although it was necessary to collect data on individual students, it was apparent that observers would not be able to identify and remember code numbers for all students in each class in which they observed (some observers saw as many as 500-600 students each week). Therefore, in order to be able to record at least some individual student data, a subsample of 10-12 "target students" was selected randomly, within sex, in each class. These target students (N = 1,614) were selected from teachers' rolls before observations were conducted in any classrooms.

One exception to random selection was made, however. In selecting target students, efforts were made to include a large sample of students who were attending both a math and an English class included in the study (N = 199). These selection procedures resulted in a subgroup of students who were taught by two different teachers and are referred to as "overlap students." Therefore, the design of the study made it possible to examine not only stability of individual teacher's behaviors across sections, but also stability of individual student behavior across teachers and subjects, as well as comparisons of appropriate student and teacher behavior in terms of learning gains in different subject matters. A thorough discussion of these stability findings may be found in Evertson et al. (Note 1)

The distribution of sex and ethnicity of students observed in the study is presented below for both target and nontarget students in each subject area.

Table 1.3

Student Sex

		Math	English	Total
Target	M	340 (10%)	462 (13%)	802 (23%)
	F	353 (10%)	459 (13%)	812 (23%)
Nontarget	M			
	F	439 (12%)	499 (14%)	938 (26%)
		463 (13%)	594 (14%)	1,057 (27%)
Total		1,595 (45%)	2,014 (54%)	3,609 (100%)

Student Ethnicity

(Target Students Only)

	Math	English	Total
No data	7 (--)	24 (01%)	31 (02%)
Anglo	502 (31%)	590 (37%)	1,092 (68%)
Mex. Amer.	119 (08%)	199 (12%)	318 (20%)
Black	65 (04%)	108 (07%)	173 (11%)
Total	693 (43%)	921 (57%)	1,614 (100%)

Instruments

A wide variey of instruments was used to collect data in this study. They can be broadly classified as either process measures, which described classroom occurrences, or outcome measures, which described the achievement and attitudes of the students at the end of the year. The results presented in this report are based on relationships between each of the process measures and each outcome.

Examples of all instruments used in the study and instructions to observers are provided in Appendices A, B, and C. A brief description of each instrument follows.

Description of process measures. The process instruments can be classified as being low-inference or high-inference. The former was an observation system used to note the frequency of occurrence of several discrete behaviors, and the latter consisted of several kinds of rating scales. Some were completed during the year and then averaged, and some were completed one time at the end of the year.

Low-inference process measures: The Classroom Observation Coding System. This was an adaptation of the coding system used in the Texas Teacher Effectiveness Study (Brophy & Evertson, Note 2; Brophy, Evertson, Baum, Crawford, & Edgar, Note 3). The modified instrument was developed to include a wide range of variables, including those used most frequently in previous educational research, as well as some unique to this study. The major adaptations and expansions were done to add variables based on Kounin's (1970) research on classroom management techniques, and to break down teacher behavior more specifically according to context variables having to do with the time and nature of classroom interaction during which a particular observation took place.

For example, while using the coding system, observers recorded the amounts of time teachers spent in various activities, such as class discussion, drill, lost time, transitions, etc. They also noted the context area of the lessons for that day (e.g., division with whole numbers or fractions for math classes, or grammar, drama presentations, literature, etc. for English classes). Such information was useful for placing frequency data within the appropriate context.

Another addition to the coding system was provision for a detailed recording of student misbehaviors (e.g., mild behaviors, socializing, sassing, verbal or physical aggression) and the manner in which the teacher handled the incident. In addition, observers recorded the appropriateness of the disciplinary intervention according to categories suggested by Kounin (target error, timing error, overreact, ignore). This allowed examination of not only the type of student misbehavior, but also teacher reaction to it and its appropriateness.

In all the system was more complex and detailed than previous systems (Brophy & Evertson, Note 2) so as to allow recording of behaviors which were more likely to occur with older students. The system was expanded to include categories allowing more detailed coding of teacher-initiated versus student-initiated public response opportunities, private contacts initiated by students or teacher (work-related, procedural, or personal-social) and classroom behavior-related incidents.

Observers were trained to a reliability criterion of 80% agreement on each major section of the system, computed according to the following formula:

$$\%\ \text{agreement} = \frac{\text{Codes agreed upon by Coders A \& B}}{\begin{array}{l}\text{Coder A's codes (which Coder B missed) + Coder B's codes}\\ \text{(which Coder A missed) + those coded and agreed on by}\\ \text{both, + those coded by both but disagreed on}\end{array}}$$

See Coulter (Note 4) for a detailed explanation of training procedures.

After all observations were completed, the low-inference data were reduced. The coding system yielded 768 frequencies which were tallied over all observations made during the year for a single class. These consisted of sums of single categories (e.g., the sum of correct answers), sums of two or more categories applicable to the same interaction (e.g., the sum of all correct answers receiving praise), and aggregates of single categories over many interactions (e.g., the sum of all answers given by the students).

These frequencies were computed for each of the 136 observed classes, and were then used to create other scores which were more appropriate for analysis.

These "final-form" variables were of two kinds: (1) rate variables, for which frequencies were divided by number of 50-minute periods for which that class was observed, thus giving an index of the mean absolute rate at which certain behaviors occurred (e.g., "correct answers per observation"), and (2) proportion variables, which were computed by dividing raw frequencies of the variables in the coding system by the frequencies of the major categories, in order to see the relative occurrence of given behaviors. For example, the proportion variable "process questions" was computed by dividing frequency of these questions by the total for all questioning categories; therefore, the proportions of the four question types (process, product, choice, and opinion) add to 1.00.

Some of the proportion variables were composed of frequencies describing the simultaneous occurrence of two discrete categories in the coding system. For example, the measure "student behaviors with management and no error" reflects the proportion of behavior contacts coded as management response (vs. nonverbal intervention, criticism, or threat) and as containing no error (vs. a target error, a timing error, or an overreaction). Each behavioral contact that was solved with only management response, and solved in a way that involved no error, counted toward the total used in the numerator of the proportion. The sum of these behavioral contacts was divided by the total number of behavioral interventions observed.

Some of these proportion measures involved more than one frequency score in the numerator or denominator. For example, the proportion variable "don't know or no response answers after which teacher gave the answer" included both the frequency of "don't know" and of "no response" answers in the denominator. (These were combined into one variable because both were low frequency variables compared to correct and incorrect answers.) Thus, the variable was derived by summing the times that teachers gave the answer to students when they either said that they did not know or made no response, and dividing this total by the total number of times that students in the class said that they did not know or made no response.

High-inference process measures: Rating scales done throughout the year. Two high-inference measures were completed during each observation, and then used to calculate single scores representing averages over the year. The *Classroom Observation Scales* were 12 5-point scales that described certain global classroom or teacher characteristics, such as level of student attention, clarity of presentation, enthusiasm, and affect. A complete description of the scales and instructions for their use may be found in Emmer (Note 5) and in Appendix B. Emmer reported between-observer reliability estimates (intraclass correlations) ranging from .48 to .89 for scales recording adequate variation among teachers. All 12 scales in the present study elicited such variation. The reliability of the high-inference ratings is also reflected in the very strong correlations between ratings of the same teachers in their two classes observed (Evertson et al., Note 1).

After completing the *Classroom Observation Scales,* observers also rated the presence or absence of certain types of teacher questioning during each observation: memory-fact related, higher cognitive level, or personal-self questions.

After each observation of a class, observers completed *Classroom Descriptions* by recording any impressions, comments, and anecdotes about what occurred during the class hour. The form and focus of these class descriptions were left relatively unstructured, because investigators were interested in capturing any extra information that was not elicited by the behavioral coding system or the observation scales. This method allowed observers to note qualitative and contextual elements of the classroom environment as well as the sequence and content of instruction. The descriptions proved invaluable for cross-checking the observation sheets during data processing, and they added an important dimension to our data on classroom events. They were scored by using a system adapted partially from that used by Tikunoff, Berliner, and Rist (Note 6), supplemented by other categories suggested by events that appeared in the descriptions. Each set of protocols, representing all the classroom descriptions written about a given class during the course of the year, was scored on 31 5-point scales for such categories as reacting to students' feelings, dividing time and attention equally among students, and perceiving learning rates of students and adjusting pace accordingly. Pairs of observers first scored all protocols independently and then resolved disagreements by discussion. Sometimes the resolution involved redefining the categories in more specific ways and rescoring the descriptions. See Appendix A for further information about these descriptions and their scoring.

It is important to note that although the *Classroom Observation Scales* and the *Classroom Descriptions* were completed after each observation, the data from these instruments were reduced to single scores representing "average" behavior over the course of the year for each class. For the

Classroom Observation Scales this was done by averaging all the ratings accumulated over the course of the year for each class. The combined set of *Classroom Descriptions* for each class was rated only once, at the end of the year.

High-inference process measures: Rating scales completed at the end of the year. There were four types of ratings done at the end of the year, two by the observers, one by teachers about their target students, and one by the students about their teachers. The *Observer Ratings of Teachers* included 79 5-point scales of such attributes as personal-social interactive style, competency in subject area, and classroom organization and control. These are listed in Appendix A. Since each teacher was scored by more than one observer, ratings were correlated to get reliability estimates. These estimates are found in Table 2. Fifteen items were dropped for unreliability when $p \leq .05$. Thus the *Observer Ratings of Teachers* produced 64 usable variables. These items were factor analyzed, producing five factor scores, which were included as the last five variables in this 69-variable subset.

The *Observer Ratings of Students* were also completed at the end of the year. Observers completed 26 5-point rating scales on each target student. These included characteristics such as work habits, likability, classroom conduct, and physical development. Again, each target student was seen by at least two observers. One rating scale was dropped for unreliability, although reliability estimates (correlations) for the remaining items were high ($p \leq .01$). See Appendix A for a list of all scales. These items were factor analyzed and reduced to four factors, which are included along with the individual items. Ratings of the students in each class were summed and averaged to obtain a score per item for each teacher and each class section. The ratings, therefore, represent "average" characteristics of the target students in a class, though their validity when used in this manner is doubtful.

Teacher Ratings of Students. At the end of the year each teacher provided ratings on 5-point scales of each target student. These ratings were also summed and averaged to yield a score for each class. For further information, refer to Appendix A.

Student Ratings of Teachers. These were collected primarily for use as an outcome measure, and they will be discussed with the outcome measures, below. However, the *Student Ratings of Teachers* were also used as predictors when achievement was used as the outcome measure.

Summary of process measures. Data will be presented in this report on eight measures which describe classroom processes:

Low inference measures:

1. Rates computed from frequencies derived from coding system data
2. Proportions computed from frequencies derived from coding system data

High inference measures:

3. Classroom Observation Scales, including the present-absent ratings of question type (completed during every observation and averaged for the year)
4. Classroom Descriptions (completed during every observation, summarized, and scored for the year)
5. Observer Ratings of Teachers (completed at the end of the year)
6. Observer Ratings of Students (completed at the end of the year)
7. Teacher Ratings of Students (completed at the end of

the year)

8. Student Ratings of Teachers (completed at the end of the year)

Description of outcome measures. There are two outcome measures administered to the students at the end of the year: achievement tests in each subject area, and Student Ratings of Teachers. In addition, the students' scores on the California Achievement Test taken in the spring of the preceding school year were used as covariables in any analyses involving the outcome measures. This combination of cognitive and attitudinal (or affective) measures was chosen in order to examine two important but different objectives that teachers might set for students in junior high school. Using these data, it is possible to examine any possible "trade-off" between cognitive learning and attitudes toward school and teachers that might exist.

Affective outcome measures: Students Ratings of Teachers. At the end of the school year, students were asked to fill out nine 5-point rating scales about their teachers. These scales included essentially two types of items: those assessing general liking of the teacher ("I would go to this teacher if I had a problem") and those assessing the degree to which the student felt he/she learned the subject matter ("I learned a lot from this teacher"). All students, both target and nontarget, filled out these assignments. The nine items were factor-analyzed, and one general factor emerged which was named "generalized likability" or general liking of the teacher.

This general factor was used as an affective or attitudinal criterion to which all other measures could be compared. Distributions of ratings for math and English classes are shown in the following figures. Scores were standardized ($\bar{X} = 50$, $SD = 10$).

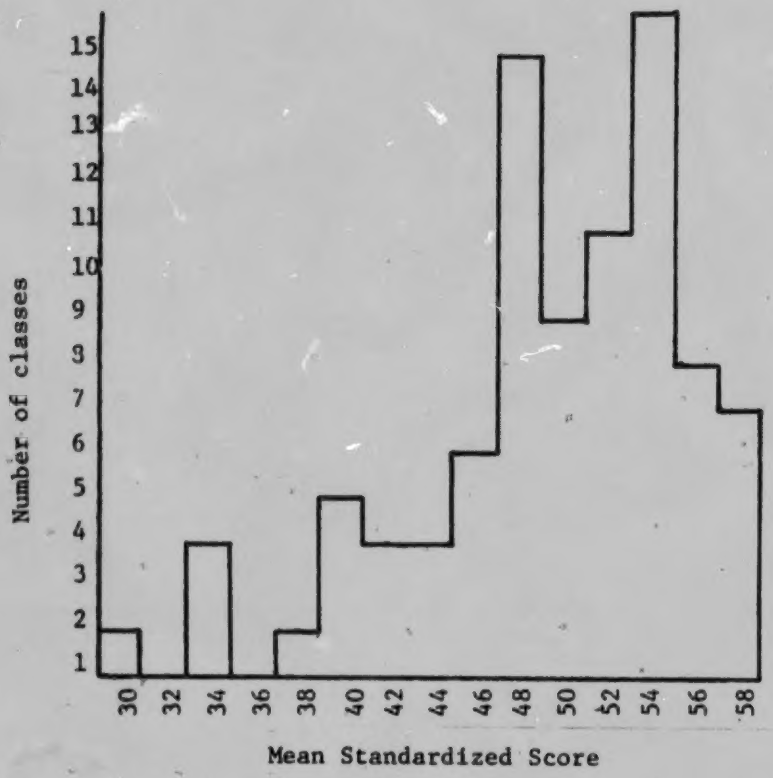


Figure 1. Distribution of student ratings of teachers for English classes (both grades included, N = 78)

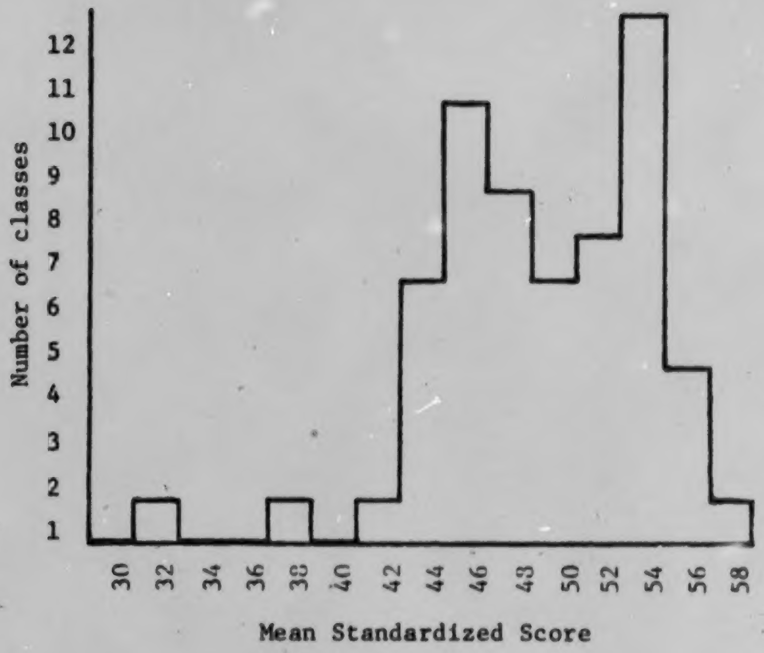


Figure 2. Distribution of student ratings of teachers for math classes (both grades included, N = 58)

Cognitive outcome measures: Achievement tests and CAT scores. Students' average scores on the English and math subtests of the California Achievement Tests given in the spring prior to observation were used to estimate entering ability. The scores for each class section were then averaged. Figures 3 and 4 show the distribution of class average scores of the CAT for each subject.

To obtain an estimate of achievement at the end of the year, tests were specially contructed for use in this study to measure knowledge of English grammar, word usage, punctuation, and spelling, and to measure knowledge of mathematical computation and reasoning.

These tests, which were administered during the first weeks of May, were designed to be content valid to the extent that the items reflected the subject matter being taught in the observed classrooms. Information on the subject matter covered was gathered from the content formats on observers' coding sheets. Also, observers were given copies of the tests, and they noted for each item whether or not its content was covered during their observation periods. Copies of the adopted texts were also consulted.

The tests were piloted in two math and two English classes in another school district, in order to judge the amount of time required to complete the tests, to adjust the item wording, and to clarify instructions. After the tests were revised and final copies were prepared, they were administered to students in each of the 136 classrooms. Distributions of scores on the achievement tests by class section are shown in Figures 5 and 6.

Prior to the administration of the tests, students were asked to fill out the student rating forms mentioned previously. These were collected, and then the achievement tests were distributed. Students were allowed approximately 45 minutes to take their respective tests. No student received a perfect score, and only a small percentage of students completed

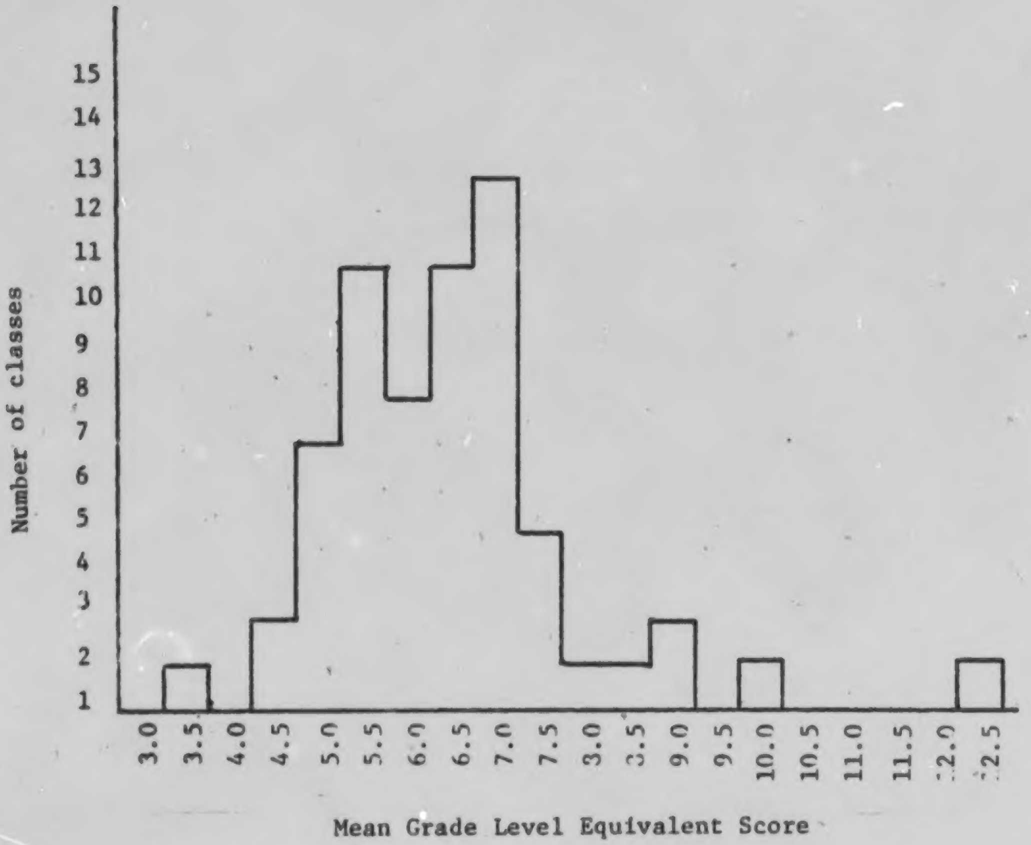


Figure 3. Distribution of CAT class average scores for math classes (average of the two subtests, N = 58)

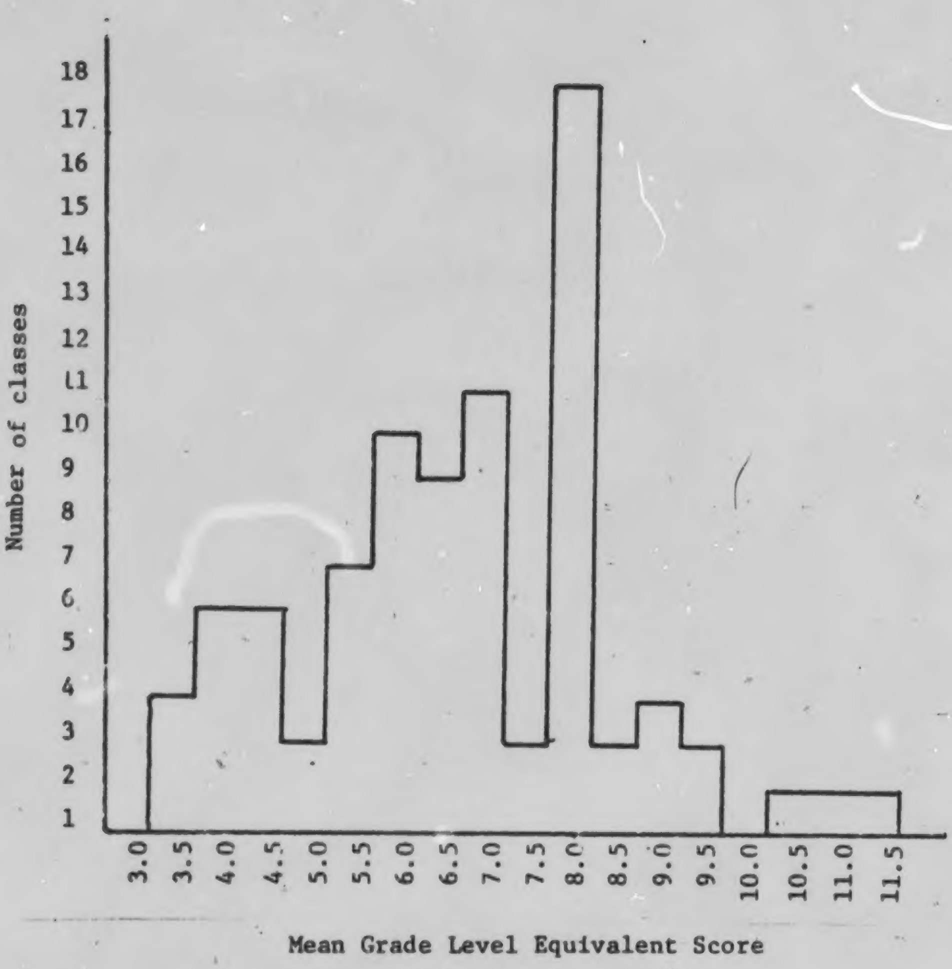


Figure 4. Distribution of CAT class average scores for English classes (average of the two subtests, N = 78)

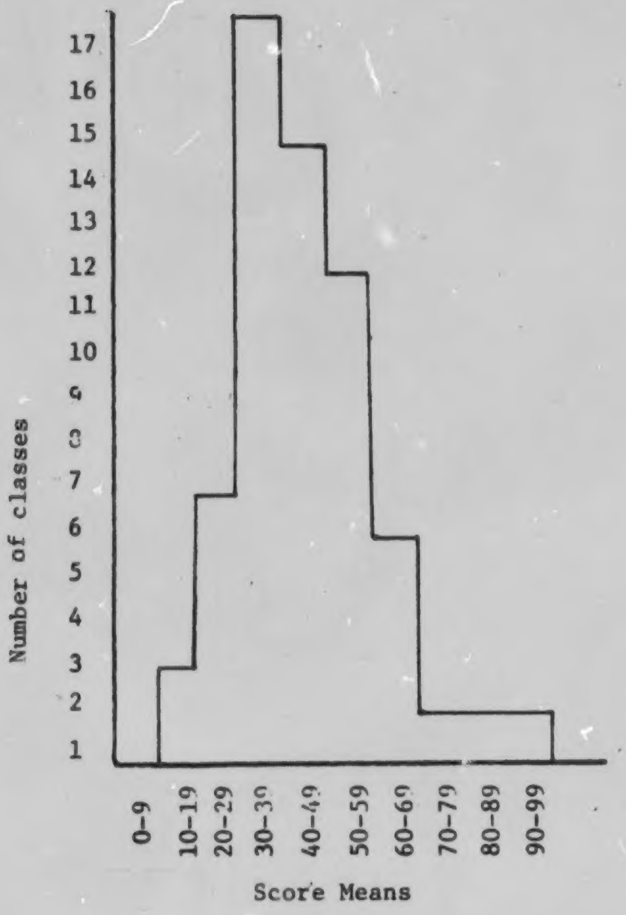


Figure 5. Distribution of class average math achievement test scores for seventh and eighth grades (N = 58)

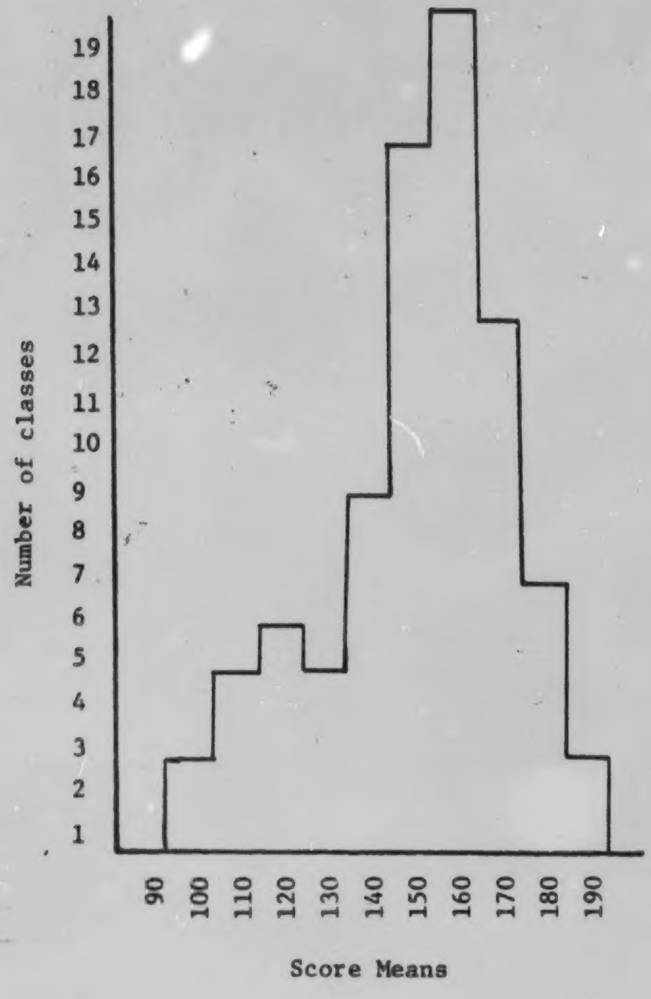


Figure 6. Distribution of class average English achievement test scores for seventh and eighth grades (N = 78)

their entire tests. While each student received a single total score, the individual test items were also scored. This information was preserved so that item analyses could be performed. Items that did not discriminate were eliminated before students' aggregate scores were computed. A Rasch analysis of the tests indicated a high internal consistency in each test and also confirmed that the appropriate items had been dropped.

The math test contained 85 items, yielding a maximum possible score of 101 ($\bar{X} = 45$, SD = 24, $\alpha = .97$). It was taken by 1, 326 students. The English test was administered to 1, 664 students. It yielded a maximum of 237 possible points ($\bar{X} = 156$, SD = 35, $\alpha = .98$). Because reading ability was a factor in obtaining a valid score on the English test, we assumed that scores below 55 would be more indicative of poor reading ability than of knowledge of the subject matter contained in the test. Therefore, English achievement test scores of 55 points or less were dropped, in view of evidence suggesting that these scores largely reflected reading problems among students who did not have English as their first language.

No such cutoff point was used for the math test, because very little of it relied on reading ability. There were, however, two math classes which were extreme outliers with regard to both achievement and CAT scores (see Figure 3). These classes were both taught by the same teacher; both had means on the CAT and achievement tests that were so high as to be out of the range of validity for those tests. Since the scores for this teacher were also extremely high for many of the classroom process measures, these two outliers were found to be exerting a disproportionate effect on the results for math classes when achievement was used as the criterion (Veldman, Note 7). These classes were therefore omitted from the sample of math classes when achievement was used as the outcome measure.

Decisions regarding the use of the outcome measures. The mean CAT and achievement test scores were computed to use in analyses relating process measures to cognitive outcomes. There were several important questions to answer regarding the choice of the achievement criterion and covariate. Large differences in general level of academic achievement existed among the nine schools observed in the study, and a certain amount of "tracking" was evident within schools. Also, a significant number of students lacked either the CAT score or the achievement test score, and it seemed undesirable to exclude these students entirely from analyses. Before performing two sets of analyses with the two outcome measures, more information was needed about their relationship to one another. In addition, current controversy regarding the measurement of learning gains, especially the use of residualized gains and the need for appropriate levels of analysis, called for a careful examination of the outcome measures before pursuing the other process-outcome analysis.

Partial correlations of several possible predictor variables with achievement test scores were computed to determine the independent contribution of each predictor to the overall variance. Stepwise multiple regressions analyses were performed with achievement test scores as the criterion, using the same predictor sets. Each set of analyses was done twice, once using only students with both CAT and achievement scores (restricted sample), and once using all available scores to form class means (full sample).

The following predictors were considered:

1. Individual CAT score (used only in analyses with restricted sample)
2. Individual CAT score squared (CAT^2) (used only in analyses with restricted sample)

3. Class mean CAT

4. School mean CAT

5. Grade (7 vs. 8)

6. Period (first observed section of a given teacher vs. second observed section)

The following conclusions were reached after performing these analyses:

1. The section period observed was not a significant predictor. (This was not surprising.) Therefore, further analyses were not done separately by period.

2. Grade level did not contribute significantly to the prediction of English achievement, and, although significant, it had only a weak relationship to math achievement ($\underline{r} = .06$). Therefore, further analyses were not done separately by grade level.

3. Once the class mean CAT was entered as a variable to predict achievement, inclusion of the school mean CAT did not significantly improve prediction of residual achievement scores.

4. Using the adjusted means based upon the full data set versus the data based upon only pupils having all scores made very little difference. In both English and mathematics, the multiple R's based upon class means computed from pupils having both CAT and achievement scores differed by less than .01 from the multiple R's based upon means that included some pupils with one of the scores missing.

5. Since the initial set of process-outcome analyses to be performed was to use the class as the unit of analysis, class mean achievement was the most appropriate criterion to use, and class mean CAT was the most appropriate predictor to use as an ability covariate. Such a decision not only kept the outcome measures at the same level of aggregation

as the process measures, but it also allowed use of the full sample of students' scores to compute class average.

6. Relationships between CAT and achievement in math were high enough to allow confidence that the achievement CAT was an effective covariable to adjust for student entering ability, but there still was room for meaningful prediction of achievement from classroom or teacher behaviors (29% of the variance was not accounted for by CAT). However, the English achievement test scores were more strongly predicted by CAT, leaving only 14% of the variance unaccounted for. (The process-outcome results reported in later sections are much more easily interpreted for math classes than English, a finding that may be due in part to this factor.)

7. Student Ratings of Teachers did indeed seem to be a separate outcome, tapping something that was different from the achievement test and not predictable from the CAT score.

Analytic Methodology

Examination of various prediction models through multiple regression techniques led us to single out class mean CAT (adjusting achievement scores from a given classroom for the average CAT for that classroom) as the covariable to be used for testing additional regression models constructed to determine which of many high- and low-inference measures of teacher behavior were related to gain in mathematics and English achievement. The "class mean CAT" control allowed us to use all available scores and to control for school differences, tracking within schools, and grade levels. In other words, once "class mean CAT" was entered into the prediction equation, these latter variables did not add to the prediction of class mean achievement.

In addition, we wished to determine the degree and direction of process-outcome relationships, to determine whether the relationships were comparable at different levels of initial ability, and finally to determine whether the relationships were nonlinear. For the purpose of these analyses, each class section was treated separately in the analyses. To determine whether process-outcome relationships depended upon subject matter, all analyses were conducted separately for math (N = 58) and English (N = 78).

Data analyses treated each class as a distinct unit rather than pooling the two classes for each teacher, because we are restricting inferences about teacher effects to those specific to individual classes. This was considered necessary in view of marked differences between classes of the same teacher where a teacher might be effective with one group and not with another. Pooling the two classes for each teacher could mask these possible differences.

Tests of process-outcome relationships were conducted using two sets of linear regression equations for each of the potentially predictive teacher or classroom behavior variables. One of the equations (listed below under "Linear Relationships") included the degree of simple relationship of the process variable to gain and also the degree of the variable's interaction with initial student ability. The second set of equations (listed below under "Curvilinear Relationships") identifies the extent and nature of any second-degree curvilinear (quadratic) relationships between the variables. These analyses are included in the tables whenever there is an interpretable curvilinear effect.

Linear Relationships

The three regression equations used in this set are shown below. As indicated, each produces a squared multiple correlation coefficient, and selected comparisons of these R^2 values yield F-ratios and associated probability values that test whether particular variables improve the prediction of class mean achievement.

$$\text{Post Ach} = \text{Pre CAT} + \text{CB} + (\text{CB})(\text{CAT}) + E_1 \qquad R_1^2$$

$$\text{Post Ach} = \text{Pre CAT} + \text{CB} + E_2 \qquad R_2^2$$

$$\text{Post Ach} = \text{Pre CAT} + E_3 \qquad R_3^2$$

Test 1:
Interaction
Effect

$$F_I = \frac{(R_1^2 - R_2^2)}{(1 - R_1^2)/(N-4)} \qquad df = 1,\ (N - 4)$$

Test 2:
Main Effect

$$F_s = \frac{(R_2^2 - R_3^2)}{(1 - R_2^2)/(N-3)} \qquad df = 1,\ (N = 3)$$

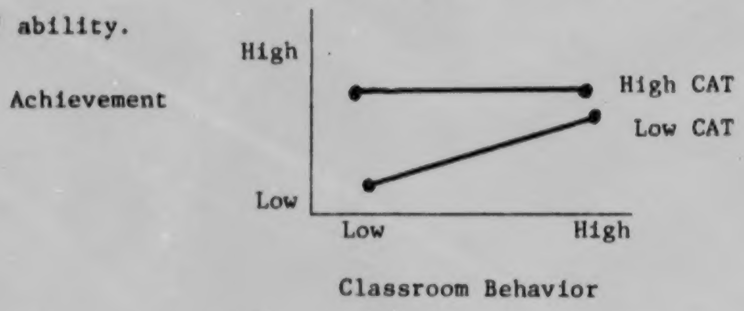
In these equations "Post" is the criterion achievement test given at the end of the school year, "Pre" is the CAT measure of initial ability, "CB" is the particular classroom behavior being assessed, and "E" represents errors of prediction. Each equation is solved for a set of weights that minimize the E values, thus maximizing R^2, which is an index of the amount of criterion variance associated with the predictor variables in the equation.

The R^2 associated with the first equation must equal or exceed that of the second, which must in turn equal or exceed that of the third, because each equation contains successively less information (i.e., fewer variables). The product variable in the first equation represents the interaction of initial ability and teacher or classroom behavior, and the first F-test therefore assesses whether the relationship is the same at all levels of initial ability. The second model assumes the relationship is the same at all ability levels, and then tests whether the relationship is significantly different from zero. Because the class pretest mean appears in all equations, initial differences between the achievement levels of the classes are "statistically controlled." For example, the second comparison asks whether the posttest is predictable from the teacher behavior beyond what is predictable from the pretest. In other language, we are asking whether, holding initial ability constant, classes that were exposed to different levels of the teacher or classroom behavior differ in their posttest achievement.

In the event that the interaction is found to be statistically significant ($p \leq .05$), expected values for the posttest are calculated for particular combinations of pretest level and classroom behavior, in order to explicate the nature of the interaction. Four combinations are presented:

Low Pre with low CB
Low Pre with high CB
High Pre with low CB
High Pre with high CB

where "high" and "low" are plus and minus one standard deviation from the mean of the variable concerned. To facilitate comparisons across classroom behavior variables, these values are scaled as z scores (mean = 0, SD = 1). In the example below, we see the the behavior is positively related to gain, but that its effect is restricted to classes whose initial ability is low (low CAT). The achievement of classes whose initial CAT scores are high do not appear to be influenced by the behavior. It is important to note that the regression line do not represent actual results for groups of classes, but predicted values for classes at two preselected levels of ability.



Classroom Behavior

The second test, which forces the implicit regression lines to be parallel, may or may not be significant, independent of any interaction effect. If both tests are significant, we still can make a general statement about the classroom behavior's effect, but with a qualification recognizing its interaction with initial ability.

In the event that only the second test is significant, we can determine the direction of the effect of the classroom behavior simply by examining the sign of the CB beta weight in the second equation.

Curvilinear Relationships

The previous set of models is sensitive only to the linear aspects of the relationship between classroom behavior and gain. To determine whether regression lines that are allowed to curve will fit the actual data points better, another set of regression models was employed.

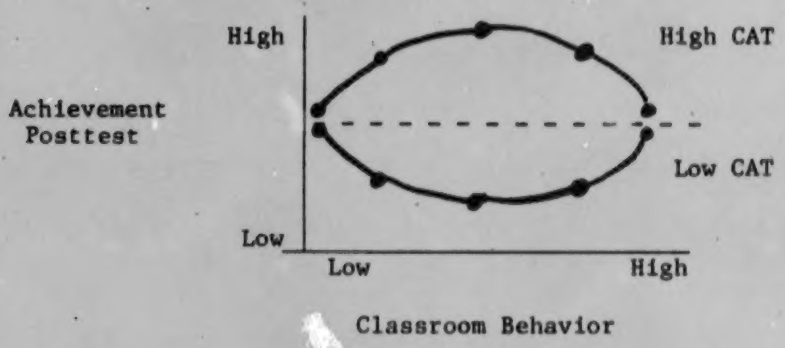
$$\text{Post Ach} = \text{Pre CAT} + \text{CB} + (\text{CAT})\ (\text{CB}) + (\text{CB})^2 + (\text{CAT})\ (\text{CB})^2 + E_1 \qquad R_1^2$$

$$\text{Post Ach} = \text{Pre CAT} + \text{CB} + (\text{CAT})\ (\text{CB}) + E_2 \qquad R_2^2$$

$$F = \frac{(R_1^2 - R_2^2)\ /\ 2}{(1 - R_1^2)\ /\ (N - 6)} \qquad df = 2,\ (N - 6)$$

The second of these equations is, of course, the first of the previous set. By adding the last two terms--squared CB scores and their products with the pretest--we permit the prediction lines not only to bend once, but to bend differently at different levels of the ability pretest.

If the F-test is significant, we conclude that allowing the regression lines to bend does indeed afford a better fit to the data, and therefore that a curvilinear relationship exists between the process and outcome variables. To obtain a graphic reflection of such an effect, five expected values are computed for the low pretest level and five for the high pretest level. Classroom behavior values corresponding to the mean, the +½ and -½ sigma values, and the +1 and -1 sigma values are substituted into the equation separately for high and low pretest scores. The resulting set of ten values can be used to produce a plot such as the one below:



In this example, the inference would be that the midrange of the classroom behavior has a depressing effect on the performance of low ability classes and an enhancing effect on that of high ability classes; but when the classroom behavior is relatively high or low, achievement is not affected in either high or low classes. There is also the suggestion here, reflected by the dotted line, that for average ability classes, the classroom behavior is not related to achievement at all.

Each predictor was analyzed in the manner shown in Figure 7 for both student ratings and achievement and for each subject matter. For ease in reporting, the tables are reproduced as they come from the computer printout (Veldman & Linsley, Note 8). The following example is presented to aid the reader in understanding the data tables.

The following interpretation can be made from the example output. The teacher's appearing to be prepared for class is significantly related to student attitude as assessed by the student ratings of their teachers (SRT). However, this effect differs depending upon whether students were high or low in initial ability. In this case, the higher the teacher's score on observers' ratings of "being prepared for class," the less facilitative for

Variable label (Classroom Behavior - CB).

Criterion of interest (Student Ratings of Teachers).

Difference in R^2 between models 1 & 2 (test for interaction).

Difference in R^2 between models 2 & 3.

Beta weight represents change in criterion (z scaled) per one standard deviation increase in classroom behavior. Sign indicates direction of change. If interaction is significant, best prediction is obtained from model 1.

Range in raw score points of the classroom behavior at + or -1 standard deviation.

```
TEACHER SEEMS PREPARED FOR CLASS
     CB VARIABLE 24        ID = 11027
     NUMBER OF VALID SCORES =     53
     MODEL 1. SRT = CAT + CB + CAT*CB   R2 =  .1269
        DIFFERENCE =  .0793   P =  .0377
     MODEL 2. SRT = CAT + CB            R2 =  .0476
        DIFFERENCE =  .0001   P =  .9333
     MODEL 3. SRT = CAT                 R2 =  .0475
     BETA FOR CB IN MODEL 2 = -.0111
     HI CB =   9.7449  LO CB =   3.0777
     EXPECTED VALUES FROM MODEL 1. (Z-SCALED)
        LO CAT, LO CB =    .7969
        LO CAT, HI CB =   -.1460
        HI CAT, LO CB =   -.4910
        HI CAT, HI CB =    .0396
```

Variable ID # used in the text.

$p \leq .05$ will result in the plotted interaction shown below.

$p \leq .05$ would indicate a significant simple relationship between the classroom behavior and criterion.

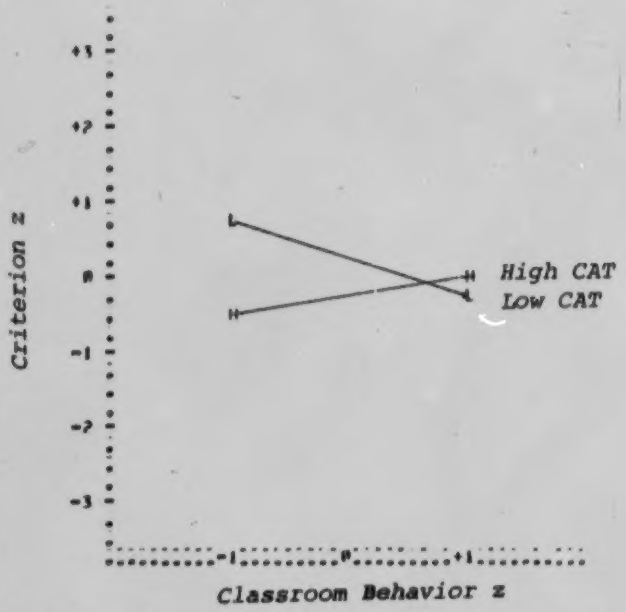


Figure 7. Example of data tables with explanatory notes

students' attitudes in classes of low average entering ability. This trend is reversed for students' attitudes in high ability classes, however. Here, the better the teacher's rating on preparation, the more positive the students' attitudes.

Classroom Homogeneity vs. Heterogeneity

Some evidence has suggested that heterogeneity of students entering ability may have a depressing effect on end-of-year achievement (Stallings, Note 9; Medley, Note 10). This suggestion is plausible for a number of instructional and organizational reasons. Handling students who have different learning styles, rates, and curriculum requirements could become a management problem to teachers to the extent that they must plan individual programs of work for these students. It would seem intuitively correct that teaching students of similar ability levels is an easier task from almost any point of view, and this assumption is one basis on which "tracking" within schools is often justified. Because of this (suggestion), we attempted to investigate this with the junior high school data by entering class standard deviation on the CAT as a predictor, using these equations:

$$ACH = CAT + SD$$

$$ACH = CAT$$

where ACH is end-of-year achievement in one of the subject matter areas, CAT is the entering class-mean ability, and SD is the standard deviation of CAT scores within the class.

The hypothesis that variability of entering ability would be related to achievement was tested by comparing R^2 values from the two equations. The difference in R^2 values for English was .0023 and for math it was .0013; neither value approached statistical significance. Class means and standard deviations were also found to be essentially uncorrelated (math $\underline{r} = .17$; English $\underline{r} = .24$).

Results

Presentation of the results of this study is complicated by the sheer number of significant relationships. For clarity, we will attempt to describe patterns that make interpretive sense and to emphasize not so much significant individual variables as the patterns that emerge from clusters of variables with similar relationships to achievement. Some findings, while statistically significant, show very weak relationships. This is more often true for those process variables that interact with entering ability. Because of this, an arbitrary cutoff point has been established to determine when a relationship is strong enough to discuss. This is a difference of .40 standard deviation units (or more) between the criterion scores predicted from +1 vs. -1 sigma values of the classroom behavior variable in the equation. All data are presented in the tables, however, and readers are free to establish their own criteria.

Throughout the text, lists of variables making up interpretable patterns will be included, along with their variable numbers, for easy reference in the tables. Chapters 2 and 3 will deal with those findings that were significantly related to the cognitive outcomes (end-of-year achievement). The data for Chapter 2 are taken from the high-inference ratings and from the observer classroom descriptions. Chapter 3 will deal with low-inference behavioral data from the classroom observation system. Data tables using cognitive outcomes as criteria are in Volume II. In Chapter 4 we will discuss variables showing significant effects for affective outcomes (student ratings of teachers). These tables are found in Volume III. Within each chapter the data will be considered separately for the two subject matter areas: math, then English.

For most variables, the linear relationships will be the ones that fit the data best. However, curvilinear analyses have also been performed,

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as previously noted. Those which are interpretable and add new information about the nature of the relationships between process measures and outcomes will be discussed and are found in the back sections of each volume. Many curvilinear analyses are omitted because they are just minor elaborations on the linear ones, or are not readily interpretable. Others include hypothetical or extrapolated points that fall outside the range of actual scores. With these eliminated, many such curves are based on only two or three real data points, not enough to interpret meaningfully.

Chapter 2: Findings from High-inference Measures for Cognitive Outcomes

The process data discussed in this section are "high inference," in that they represent global impressions, rather than counts of discrete behaviors. Copies of the instruments used are in Appendix A. The six types of high inference measures were:

1. *The Classroom Observation Scales*. Fifteen scales completed during each observation yielded information about types of teacher questioning and interaction styles. These were averaged across the year to produce a score for each of the 136 classes. The scales were based on behaviors or classroom processes which were commonly included in classroom observation systems. Results will be presented for each of the 15 separate scales, as well as for the four factor scores.

2. *Observers' Ratings of Teachers' Methods and Practices*. At the end of the year, the classroom observers completed 79 scales on each of the teachers. These differ from the Classroom Observation Scales in that they represent summary or overall impressions given after several hours of observation in each classroom. There were several separate ratings for each of three major areas of teaching behavior: classroom management, personal-social interactive style of the teacher, and methods of teaching academic content. Five factor scores were also created for each class on the basis of these ratings.

3. *Classroom Descriptions*. A third source of high inference data about teachers in their classrooms was a set of written classroom descriptions completed after each observation. The instructions to the observers were to describe important or salient aspects of each observation period.

At the end of the year, the set of descriptions for each class was read by two persons who rated them on 31 5-point scales. Therefore, each class had a score of 31 scales which represented the set of classroom descriptions. This data set differed from the rating scales described above in that these ratings were based on relatively unstructured descriptions of the most characteristic aspects of each classroom visit.

4. *Student Ratings of Teachers*. At the end of the year, the students were asked to rate their teachers on nine 5-point scales to determine the students' opinions of the teachers' competence and personal relationships with students. Factor scores were also created from these nine rating scales. The ratings and factor scores were averaged for all students in each class. For results using these student ratings as an affective outcome measure, see Chapter 4. In this chapter, the student ratings will be examined as predictors of teacher success in inducing student achievement.

5. *Observer Ratings of Students*. In addition to measuring aspects of teacher behaviors and classroom processes, high inference data were obtained on individual students. These were averaged for each class in order to gain a picture of student behaviors and characteristics most evident in that classroom. There 26 5-point scales and four factor scores.

6. *Teacher Ratings of Students*. The teachers were also asked to rate students in their classrooms on five 5-point scales. (These were only completed for the "target student" sample, which was randomly selected within sex.) The scores were averaged to obtain a mean score to represent

the teacher's perceptions of student characteristics in his or her class.

Therefore, the high inference data discussed in this paper represent several different approaches to measuring aspects of classroom life which may be viewed globally. The total number of variables involved is very large, and not all of the variables are equally reliable. Complete information on the relationship of each variable with student achievement gains can be found in Volume II, pages 1-48 (math) and 233-287 (English). Since the sheer mass of data makes it difficult to interpret, we have prepared summary tables, which are presented as Table 2.6 at the end of this chapter. In Table 2.6, the math and English data are grouped together, and variables from different data sets which are concerned with the same topic (e.g., classroom management) are also grouped together.

Additional information which may be helpful in interpreting the data is contained in Tables 2.1 - 2.5, which list variable numbers, variable names, factor loadings, and information on the distribution or reliability of each variable. Appendix A also contains copies of each of the instruments used to collect the data.

Each of the ratings and factor scores was included in regression analyses according to the procedures described in Chapter 1. The results in this chapter will be limited to the relationships between these variables and the student achievement measures. Relationships with math achievement will be discussed first, and then results for English classes will be given. Within each section, we will discuss the results from each set of variables. At the end of each section, we will summarize the most important patterns of results for classes in that subject.

Relationships with Math Achievement

Overall, the data for math classes indicated that the more effective teachers had well organized and highly structured classrooms in which a great deal of public interaction occurred. The high-inference data for math classes support the low-inference data presented in the next chapter.

Results will be presented first for each type of measure, and then summarized according to patterns of relationships across measures. Numbers in parentheses are variable numbers used in the tables in Volume II.

1. *Classroom Observation Scales*. Results indicated positive relationships with achievement for teacher presentation of questions for discussion. This included all types of questions from lower order fact questions to "higher cognitive level" inquiry.

The Classroom Observation Scales produced 19 variables: 15 individual scale scores and four factor scores. Table 2.1 contains descriptive data on these 19 variables. The tables in Volume II, pages 1-6, contain complete information on the relationship of each of these variables with math achievement. Significant results are described below.

Teacher initiated problem solving (01002) represented the extent to which the teacher asked questions and provided response opportunities to the students. There was a positive relationship with achievement for both high and low level classes. The range of obtained scores for this variable indicated that most teachers were rated as 1, 2 or 3. Therefore, this result should not be interpreted to mean that high amounts of teacher initiated problem solving behavior was beneficial, but that within the actual range of behaviors observed, those teachers who filled some of their class time in this way produced higher achievement than those who did it less often.

Teacher presentation of academic information (01004) was positively related to achievement for high ability students, suggesting that direct teacher presentation of the lesson context may be a more efficient method for getting across subject matter for these students.

Also, clarity of teacher presentation (01011) and teacher task orientation (01010) showed positive noninteractive relationships with achievement. The obtained ranges for these variables indicated that more effective teachers were high on both of these variables, maintaining a high degree of attention to the task at hand, and giving clear explanations of work to be done.

The more effective teachers also tended to elicit more "higher cognitive level student behaviors" (01007). On this scale there was an overall positive relationship for both high and low ability classes. Again, the range of scores suggests that the more effective teachers occasionally (not frequently) elicited this type of student behavior, as compared to the less effective teachers who almost never did it.

The group of variables in this data set which were measures of types of questions all showed positive noninteractive relationships with achievement. These were random, memory, or fact-related questions (01013); higher cognitive level questions, including synthesis and "why" questions (01014); and personal questions or questions with applications to students' lives (01015). The obtained ranges suggested that most teachers did not ask these kinds of questions, but there was an apparent facilitating effect for those who did.

One affective measure, negative affect (01005) showed negative relationships with achievement for high ability students, as might be predicted. The range of scores indicated that a negative or hostile tone seldom occurred to a large degree. No teacher was rated as having as many as two or three mildly negative behaviors per class period.

All four factors obtained from reducing the classroom observation scales were significantly related to achievement:

Factor 1: Attention, clarity and instructional activity (01020) was positively related to achievement for both ability groups. This factor consisted of positive ratings on pupil attention, clarity of presentations, and task orientation plus negative ratings on pupil behavior, passive and negative affect. Three of these variables were significant when considered alone. Single ratings on the other variables in the factor did not yield significant results.

Factor 2: Positive affect and enthusiasm (01021) also was positively related to achievement for high and low groups. Positive affect, teacher enthusiasm, questions with applications to students' personal lives, and teacher initiated problem solving were the individual ratings which made up this factor. All showed individual relationships to gain except positive affect.

Factor 3: Teacher questioning and evaluation (01022). This factor loads heavily on items describing all cognitive levels of questions. Most of the single ratings composing this factor were also significantly and positively related to achievement for both groups.

Factor 4: Pupil interaction (01023) (vs. teacher presentation) shows a negative relationship for high ability students. These students showed greater achievement gains in classes which were rated by observers as having high levels of teacher presentation and low levels of pupil-to-pupil interaction.

2. *Observers' Ratings of Teachers' Methods and Practices*. The 79 rating scales completed by observers at the end of the year produced 64 usable individual scale variables and five factor scores. Table 2.2 contains data describing these 69 variables. The tables in Volume II, pages 7-26, contain complete information on the relationships of each of these variables with math achievement.

Classes with high achievement were characterized by having more effective management, organization, and teacher control. Some personal characteristics of teachers were significant, such as enthusiasm and confidence. There were also significant relationships for several variables describing teachers' personal orientation to student needs. Ratings which described specific teaching techniques suggested that the more effective teachers had made more provisions for class discussion and minimized their use of individualized and self-paced work.

Scales describing classroom management. Ten separate scales and one factor score describing classroom management showed significant relationships with achievement. In all but two cases, these were not interactive, indicating equally important relationships for both high and low ability classes. The following variables related positively to achievement:

02003, Effectiveness of teachers' management methods
02008, Student obedience to teacher
02014, Consistency of enforcement of rules
02021, Monitoring of class
02022, Efficiency of transition during the class period
02065, Factor 1: Effective organization and control

These variables showed negative relationships with achievement:

02010, Classroom interruptions

02013, Frequency of seat arrangement changes

02018, Amount of disturbance teacher will accept

Two other variables showed negative relationships for high ability students: teacher granting requests to go to the water fountain or restroom (02015) and length of time for the class to begin after the bell rings (02016).

Two of the variables (seating changes and water fountain requests) showed a restricted range, indicating that almost all of the teachers in the sample fell in the lower end of the possible range. This suggests that there were not very many instances of bathroom requests or seating changes, but that within the observed range, there was a negative relationship with achievement. All of the other variables showed observed ranges across the entire available scale.

Not surprisingly, there was a strong positive relationship with achievement for the factor "teacher organization and control " (02065). This factor was composed of the single variables already given plus some others such as academic effectiveness of teacher and time spent in productive work.

A similar study done in second and third grades (Brophy & Evertson, 1976) suggested that classroom management was an extremely critical variable in determining teacher effects on class achievement. This pattern of results is also evident for junior high math classes. That is, the more effective teacher was the one who had established control over classroom processes and who maximized efficient use of instructional time. The negative relationships for classroom interruptions and frequent requests granted for the bathroom or water may reflect a lack of teacher control, which makes it easy for the students to provide their own distractions. The negative relationship for frequency of seating changes may reflect teacher reactions to management problems.

Scales describing personal characteristics of the teacher. Several scales were included to describe personal characteristics of the teacher and his/her personal relationships with students. Some variables which described the teachers' orientation to affective concerns and personal relationships with the students showed no significant relationships to achievement. These included ratings of teacher affection (02023), solidarity with the group (02026), socializing (02032) and showmanship (02035).

A group of observer rating variables which showed positive main effects were:

02028, Teacher confidence level

02029, Teacher enthusiasm

02030, Student respect for the teacher

02031, Effective dealing with student personal problems

02034, Teacher credibility

Also positively related to achievement were factors which included these and other variables describing an orientation to students' personal and affective needs (02066), and describing teacher competence and confidence (02069).

Another indication of overall competence and appeal was the rating, "coder would choose this teacher if a seventh or eighth grader" (02064). There were positive relationships for both ability groups for this variable.

These results indicate that the teacher who is most effective with both high and low ability students in junior high math classes is one who comes across to the students as confident and one who commands respect. These characteristics are easy to relate to the findings for classroom management, in that the teacher who is most likely to have effective management is the one who can carry out the teacher's role as leader of the classroom, attend to personal needs and problems, and command student respect.

Scales describing teaching methods and practices. Several specific teaching techniques were also rated at the end of the year. Those which showed significant relationships with achievement showed similar (noninteractive) relationships for both high and low ability classes. These scales included descriptions of the format used to convey information, as well as more global perceptions of the way in which the teacher presented academic content.

There were positive relationships for both groups for teacher concern for academic achievement and grades (02056), as well as academic encouragement offered by the teacher (02036).

There were also positive relationships for the amount of teacher preparation (02050), teachers' academic effectiveness (02052), and the amount of class time spent in productive work (02054).

These general descriptions indicate that the more effective teachers valued achievement. They were also "proactive" in the sense that they prepared for class and encouraged students in class to excel academically.

Several variables examined the extent to which teachers used lecturing, class discussion, and seatwork in math classes. There was also a factor score which described the extent to which seatwork was used rather than class discussion. The obtained ranges indicate that seatwork was used more often than either lecturing or class discussion.

There were no significant findings for the scales describing the frequency of lecturing (02057) but there was a negative overall relationship for assigning large amounts of seatwork (02058). However, there was a positive relationship for both ability groups for the scale measuring frequency of class discussions (02059). This is also supported for a rating for the time allotted for class discussion (02048), although this was positive for high ability students only. The obtained ranges for each of these two variables indicate that class discussion was not used very much of the time in most math classes, but that within that range, there was a positive relationship with achievement. Most classes had public discussion 30% of the time or less. Likewise, the factor score which described the relative use of seatwork and discussion yielded significant results. The higher the relative use of discussion, the greater the achievement.

Related to public discussion variables, the teachers' receptiveness to student input (02037) also showed positive relationships with achievement. The teachers' rated frequency of use of the blackboard for lecturing and discussion (02041) showed positive relationships with achievement for both high and low ability groups. There were no significant relationships for the use of audio-visual equipment (02042).

There were negative relationships for both high and low groups for variables describing the variety and choice of assignments (02039) and the teachers' use of self-paced work (02040). Extensive use of such approaches was rare, and might have resulted in problems with management and monitoring which would have an adverse effect on achievement.

3. *Classroom Descriptions*. The 31 categories used to rate the classroom descriptions are listed in Table 2.3 at the end of the chapter, along with distribution statistics. Complete results showing the relationship of each variable with math achievement are in Volume II, pages 41-48. Fifteen of the categories showed significant relationships with achievement in math. All of these findings were noninteractive, so that relationships were similar for high and low ability classes. The N's for analyses in this subset of data were reduced, since information about all categories was not included in all sets of descriptions. The N is given below for each significant result.

All class sections received an overall evaluation by the raters, and this rating showed positive relationships with achievement (11032), which was not surprising.

The single descriptive categories which related to achievement can be clustered into three groups which correspond to the categories of ratings just discussed: management related variables, variables describing the teachers' interpersonal style, and the teachers' academic style or style of interactions.

Classroom management. Those classroom management variables which showed positive relationships to achievement were:

11004, Consistency: when teacher makes a threat, it is followed out (N = 35)

11029, Students respect the teacher (N = 33)

11030, Classroom management: teacher is in control of class and maintains order

A negative relationship with achievement was found for:

11031, Time wasting: time is spent in activities such as off-task talking, fooling around (N = 47)

These variables support similar results for the Observer Ratings of Teachers.

Personal Characteristics. Those adjective categories which were positively related to achievement and which described the teacher's interpersonal style were:

11001, Accepting: teacher reacts positively to students' feelings (N = 11)

11005, Conviviality: warm, family-like feeling in classroom, positive feelings among class (N = 27)

11006, Cooperation: students cooperate with others and teacher (N = 37)

11010, Equity: teacher divides time and attention among all students (N = 26)

11015, Job satisfaction: teacher seems to enjoy teaching (N = 18)

11020, Openness: teacher acknowledges students' feelings, both positive and negative (N = 17)

These variables suggest that math teachers who demonstrated warm acceptance of their students and openness toward their feelings produced high achievement. However, similar variables used in the Observer Ratings of Teachers did not show such findings. This might be due to the differences in the instruments. The classroom descriptions included information on these variables only when it was most salient, and therefore, only included the extremes for the characteristics in question, as demonstrated by the lower N's. However, in the Observer Ratings of Teachers, all classes were rated on the scales, and the few extreme cases which were detected with the Classroom Descriptions were probably not enough to define a relationship for the entire sample.

Academic style. The following variables are descriptive of teachers' approach to academics, and related positively to achievement:

11009, Encouraging: teacher encourages student effort, given support for work (N = 29)

11023, Promoting self-sufficiency: teacher encourages students to take responsibility for their own work (N = 26)

These two variables were related negatively to achievement:

11011, Teacher fills empty time with busy work (N = 11)

11015, Teacher assigns learning tasks to match individual abilities/interests (N = 33)

The first three results suggest that classrooms in which students achieved the most were ones with much emphasis on meaningful task-oriented behavior, with the students being responsible for their own work. The fourth result is perhaps related to others which showed negative relationships with achievement for higher levels of individualization and self-pacing. These may be explained by the shorter times each student is in direct contact with the teacher in settings in which the teacher is trying to individualize. When students have less contact with the teacher, they do not achieve as much. The range of scores for this variable indicated that all levels of use of individualization had been sampled, at least within the 33 classes with valid data on this measure.

4. *Student Ratings of Teachers*. The fourth high-inference source of

data about teachers in the study came from the students themselves. Distribution statistics for the nine scales on which the students rated their teachers and descriptions of the five factor scores are contained in Table 2.4 at the end of the chapter. Complete relationships of these variables with achievement are in Volume II, pages 35-38. Four of the nine scales showed significant relationships with achievement in math, and four of the five factor scores were also significant. All of these relationships were for the entire sample, both high and low ability students.

Positive relationships with achievement were found for those scales describing the teachers' competency and the students' learning of the content. These variables were:

04001, Students think the teacher knows the subject well

04002, Students think the teacher is always prepared and organized

04003, Students think the teacher enjoys teaching

04007, Students feel they have learned a great deal in the class

04009, Students would ask for this teacher next year

For many of these relationships, although there was not a significant interaction, the low ability classes had steeper slopes than the higher ability classes.

Factor scores which showed significant positive relationships with achievement were:

04010, Generalized liking of teacher

04011, Female students' view of teacher competency

04012, Male students' view of teacher competency
(high ability boys only)

04013, Female students view of favorable teacher-student relationships

04014, Male students view of favorable teacher student-relationships

For both sexes combined, the student ratings describing favorable teacher-student relationships were not related to achievement. Therefore, in general, the students' view of the teacher as someone who is interested in them or someone to whom they could go with a personal problem did not contribute to achievement. However, the factor scores were positively related to achievement.

5. *Observer Ratings of Students*. The 25 scales on which observers rated target students and reliability coefficients for each are listed in Table 2.5. Table 2.5 also contains descriptions of the four factor scores. Relationships with achievement for all 29 variables are in Volume II, pages 27-34. Fifteen out of 25 rating scales of student characteristics were significantly related to math achievement. The significant variables can be classified into groups of social characteristics, classroom behavior characteristics, and academic achievement.

Social characteristics. Many of the significant results showed interactive relationships, which usually showed a steeper slope for the low groups.

One variable which was positively related for both high and low groups was "student has good relationship with teacher" (03017). Even though the test for interaction was not significant for this variable, the lower ability classes contributed much more to the relationship than the higher ability classes.

Two variables showed negative relationships with achievement for both low and high groups:

03018, Student has chip on shoulder and engages in physical or verbal abuse

03021, Student lacks cooperativeness, shows no desire to work with others

For each of these two variables, lower ability classes were contributing most of the slope, and this was found within a fairly restricted range of scores toward the lower end of the scale. These findings suggest that few students evidence behaviors described by these scales, but that the more that are in a class, the lower the class mean achievement is likely to be, especially in lower ability classrooms. Even though these are ratings of student characteristics, they are not completely student determined, since students could be reacting to a teacher's style or control by demonstrating such behaviors.

There was an interactive relationship for the variable "student has good peer relationships" (03016). Here, higher ability classes had a negative slope, while lower ability classes had a positive slope. It might be that "good peer relationship" means different things in higher and lower ability classes. Perhaps in higher ability classes, when good peer relationships are evident to an observer, they represent lack of teacher control. However, in lower ability classes, evidence of good peer relations might represent greater involvement with the subject matter, and a more general positive affect while in that classroom.

Factor scores were created for this set of data. Although several individual ratings showed relationships for social characteristics, there were no significant relationships with achievement for the factor describing charisma (outgoingness, sociableness, happiness) with peers and teacher

(03028), or for the factor describing students with "anti-social tendencies" (03030).

Classroom behaviors. Three scales which describe behavioral characteristics were significantly related to achievement. The average rating for "student is obedient" (03002) showed a positive relationship with achievement. Most of the slope was contributed by lower ability classes, although the interaction was not significant. This variable probably reflects the teacher's overall classroom management abilities.

Likewise, the rating for "student has behavior problems and disrupts class frequently" (03002) showed negative relationships with achievement. Once again, most of this relationship was contributed by the lower ability classes.

There was an interactive relationship for the variable "student is continually talking to neighbors" (03020). There was a slight positive relationship for high ability students, but the slope was not very steep. There was a steeper, negative slope for lower ability students. One apparent exception is the positive relationships for highs for "student is constantly attended to by teacher" (03005). This rating was an index of the degree of interaction that individual students had with the teacher ($\bar{X} = 3.9$). Highs appeared to benefit most from greater amounts of interactions with their teachers. As a set, these variables suggest that classroom management which maintains order and minimizes disruptions for the students is optimal for achievement. This appears to be especially important for lower ability students, but highs especially benefit from increased teacher contact.

Academic characteristics. Five variables describing academic characteristics of students were related to achievement, and none were interactive. Not surprisingly, the variable "student is highly motivated and eager" (03009) showed positive relationships with achievement. Again, most of the relationship was contributed by lower ability classes.

Three single items showed clear negative relationships with achievement:

03004, Student has bad work habits, short attention span, is unprepared to respond

03014, Student lacks persistence

03019, Student is irresponsible, doesn't turn in work on time, comes without supplies

Not surprisingly, the factor score for low achievement motivation, low interest and poor work habits (03027) showed significant negative relationships with achievement, and the slope was especially steep for lower ability classes.

Since these scores were averaged for each class, and since many of them describe extremes of behavior which were not expressed by most students, the range of scores is limited, and is close to one end of the possible range. However, even within limited ranges, these relationships suggest that the more students in a class who can be viewed in fairly positive terms, the higher that class achievement is likely to be. Given the pervasive findings for the importance of classroom management and teacher control, and given the findings within the Classroom Descriptions for the importance of teacher responsiveness to students, it is likely that many of these so-called student variables are dependent on the way the teacher runs the classroom. That is, a student may have tendencies toward extroversion, uncooperativeness, or obedience, but the teacher will probably affect the absolute amount of such behaviors shown by the students. However, the influence of student behaviors and characteristics cannot be discounted, and these data cannot conclusively attribute certain problems to either teacher or students.

6. *Teacher Ratings of Students.* The last source of high-inference data is the class average on five rating scales completed by the teachers for about half of the students in that class (target students). There were no significant relationships found between achievement and teacher ratings.

Summary

The more effective teachers in math generally won positive evaluations from both the observers and their students. They were considered to be confident and enthusiastic; they were rated as more effective classroom managers; their students seemed to respect and obey them, and they spent more time on task. The students of the more successful teachers generally liked them, saw them as competent, and said that they felt comfortable with them. The students in their classes were rated as more cooperative, motivated, eager to learn, and were less likely to be rated as irresponsible or lazy. It is hardly surprising that teachers and classes with these characteristics were more academically successful. The association between achievement gains and positive evaluations tends to support the validity of both data sets.

The more effective teachers also differed from their less successful associates in a number of less predictable ways. They tended to use more class discussion and less seatwork than the less effective teachers, and they asked many questions, both higher and lower level. Use of individualized instruction, self-paced work, and giving students choices in their assignments were all negatively related to achievement gains. Finally, the more successful teachers generally were rated as placing a heavy emphasis on academic matters, and as working hard to encourage the academic success of their students.

Relationships with English Achievement

1. *Classroom Observation Scales*. There were no significant relationships with English achievement for any of the 15 scales or four factor scores in this set of ratings. This indicates that the types of behaviors described by these scales (level of questioning and the teachers' general style of interactions) had little effect on English achievement as it was measured (knowledge of grammar, spelling, word usage). Tables presenting the relationships of the Classroom Observation Scales with English achievement can be found in Volume II, pages 233-237.

2. *Observer Ratings of Teachers*. Five of the 64 scales showed significant relationships with English achievement, but these do not fit together in a clear, cohesive pattern as they did for math classes. Since this small number of significant findings could be due to the effects of statistical chance alone, they must be interpreted with great caution.

One of these significant findings might be related to teacher management style. There was a positive relationship for the variable "teacher uses explanations to solve behavior problems" (02017) for both high and low groups. The obtained range of scores for this variable indicated that most of the teachers were rated as either a _1_, _2_ or _3_ on this scale, which meant that they ranged from typically telling students to "just knock it off" with attendant threat or criticism, up to a moderate use of explanations as to why students shouldn't do what they did. Therefore, the positive relationship does not indicate that the more effective teachers usually gave such extended explanations, but only that they used them some of the time.

Three variables which described the teachers' instructional style and technique were significant. The first of these was the "teacher's attention to learning disabled students or slow learners" (02051) for which data were available for only 56 teachers. There was a significant interaction here, but the slopes for the two groups, although different from one another, were not steep enough to define clear relationships within each group.

The rated frequency of homework (02053) showed both an overall positive relationship with achievement, as well as a significant interaction. An examination of the slopes for the high and low ability groups shows that the higher ability classes had a near zero slope, while the lower ability classes showed a positive relationship with achievement. The obtained ranges indicated that few teachers assigned daily homework. Their use ranged from "seldom" up to a few times a week. If homework can be accepted as provision of additional practice and reinforcement, and if it can be assumed that lower ability classes needed more practice, then this finding is sensible.

The third instructional variable which demonstrated a relationship with achievement was the rating for "teacher consistently gives feedback on assigned work" (02063). Again, there was a significant interaction such that there was no clear relationship for higher ability groups, but a negative slope for lower ability classes. This variable might represent a less efficient use of class time than a more streamlined approach to feedback. If this is the case, this might be considered a teacher management variable, rather than an instructional variable. If too much class time was spent in following up on seatwork and homework assignments by giving answers to the students, this could have taken the place of presentation of new material and new skills.

Ratings of crowdedness of the classroom (02004) were related positively to achievement for both high and low groups. This is difficult to explain, but might reflect either better attendance or student selection of the better teachers when given the opportunity to choose teachers.

Since no clear pattern was found in these results, no single finding should be considered as meaningful. There was much overlap built into the selection of the scales, and therefore, meaningful patterns are expected to emerge as significant findings if there are strong relationships with achievement. However, the results for the two sets of rating scales are not cohesive. This is in contrast to the clear pattern demonstrated in the math data.

Tables presenting the relationships of all Observer Ratings and factor scores with English achievement are in Volume II, pages 238-256.

3. *Classroom Descriptions*. Five of the 31 descriptive categories showed significant relationships with English achievement. However, these did not fit together in a cohesive pattern which allowed confident interpretation.

Two of these variables showed interactive relationships for affective characteristics of the classroom. The first was "students cooperate with others and teacher" (11006, N = 33). The interaction for this variable involved a negative slope for higher ability classes and a positive slope for lower ability classes, indicating that the more cooperation evident among the students, the better was learning in low classes, and the worse was learning in high classes. This might represent different functions of peer relationships in classes at the extremes of the ability range. This interpretation was also suggested by some of the findings in the math data, particularly for "good peer relations" as an observer rating of students.

An interaction was also found for "teacher seeks contacts with students, talks with them and shows affection for them" (11026, N = 52). A similar pattern was found for this variable, although the negative slope for high classes was not very steep. This result suggests that more effective teachers of lower ability students were those who did demonstrate more warmth toward the students in English classes, but that teachers of higher ability students who demonstrated higher levels of warmth were less effective. The actual range indicates that very few teachers were rated low on this variable, so that the range was actually from a moderate amount to a high amount of warmth.

A positive relationship with achievement for both high and low groups was demonstrated by the variable "teacher seems to enjoy teaching" (11015, N = 30). It is likely that teachers who evidenced liking (or disliking) of their jobs in such obvious ways that observers would note this would also be those teachers who would evidence either confidence (or anxiety), and who would be more (or less) likely to demonstrate positive affect toward their students.

The variable describing management skills, "teacher emphasizes quietness, orderliness and good behavior" (11002, N = 57), showed positive relationships with achievement for both groups. This is the only indication that overall classroom management skills were related to English achievement. This was not supported by similar ratings in the other subsets of data.

There were significant negative relationships with achievement for the variable "teacher perceives student learning rates and adjusts learning pace" (11021, N = 25). Scores on the variable covered the possible range, from very low to very high, although most of the valid scores fell near the high end. This might mean that teachers who spent too much time in dealing with individuals and perhaps trying to gear lessons toward individuals rather than the entire group might be missing contact with many of the children. This might also reflect a reluctance to challenge students.

As with the other sets of data, these few findings do not hang together in a strong, cohesive pattern within the data set.

4. *Student Ratings of Teachers*. Six of the nine scales showed significant interactions such that there were stronger relationships for lower ability classes than higher ability classes. In lower classes, there tended to be negative relationships with achievement for ratings of teachers, especially for those variables which reflected personal feelings about the teacher.

There were no relationships with English achievement for ratings of "I learned a lot in this class" (04007), "I enjoyed this class" (04008), "teacher knows the subject matter" (04001), or the factor scores for male students' rating of "teacher competence" (04012). These results suggest that student attitudes toward the quality of the academic content were not related to performance on the achievement test.

However, the following ratings all showed interactive patterns with negative slopes for the low ability students and no relationship or slight positive relationships in higher ability classes:

04002, Students think the teacher is always well prepared and organized

04003, Students think the teacher enjoys teaching

04004, Students think the teacher has interest in knowing class as well as in teaching

04005, Students feel comfortable in asking questions or asking for help

04006, Students feel comfortable about going to teacher with a personal problem

04010, Factor score for generalized liking of teacher

04013, Factor score for female students' view of favorable teacher-student relationships

04014, Factor score for male students' view of favorable teacher-student relationships

There were significant interactions shown for two other variables, but each single slope was not steep enough to define clear relationships. These variables were "students would ask for this teacher again next year" (04009) and the female students' view of teacher competence (04011).

It may be that in lower ability English classes, teachers who oriented their instruction toward learning the skills covered on the English achievement test were not personally liked by the students. This was not the case in the higher ability classes, where there tended to be slight positive slopes for these variables. Tables presenting the relationship of each of the above variables with English achievement are in Volume II, pages 269-275.

The next two sets of data discuss the ratings of students as averaged for each class. There were more significant relationships with English achievement here, which support the conclusion that performance on the achievement test in English was more dependent on student factors than on classroom factors.

5. *Observer Ratings of Students*. Thirteen of the 25 scales showed significant relationships with achievement, and 11 of these showed interactive relationships. (However, most of the interactions did not include clear relationships within either group, even though the slopes of the two groups were significantly different from one another). Those variables which showed significant relationships for the total group (i.e., no significant interactions) actually had most of the slope in the relationship contributed by the low group. These results suggest that in higher ability classes, student characteristics were of less importance in determining achievement than they were in lower ability classes. This might be due to different backgrounds of the students, in that higher ability classes are more likely to be found in higher SES schools, where students are more likely to have had exposure to correct grammar and word usage outside of school than students of lower SES schools. Therefore, teachers of lower ability classes would have had more effect on the English usage of their students.

The following variables showed clear negative relationships with English achievement for lower ability students, but no strong relationships for high ability classes:

03001, Student is very outgoing or extroverted

03023, Student has athletic ability

03028, Factor score for physical and athletic development

Two other variables did not show significant interactions, but examination of their slopes suggested that relationships within lower ability classes were stronger:

03013, Student is physically mature

03016, Student has good peer relations

There was a positive relationship found within lower ability classes for the variable "student is highly motivated and eager" (03009).

The interpretation of these data is difficult. Although the ratings were collected as descriptions of individual students, the ratings of all the target students in a class were averaged for the purposes of data analysis. The ratings, therefore, represent "average characteristics" of students in a given class. These characteristics may be brought with the student into the classroom, and would not necessarily reflect classroom processes. However, since these student ratings were class averages, they might be reflecting something that the teacher is doing, although such teacher behaviors were not detected with the other high-inference measures.

These data suggest that lower ability classes where students are more concerned with nonacademic issues achieve less than those classes where students are more concerned (i.e., motivated and eager) with academic matters. It makes sense that the latter type of student is going to be more attentive to systematic learning of English usage, and therefore, would do better on such a test. It is interesting that these types of relationships between the students' concerns and achievement were not demonstrated for higher ability classes.

Tables presenting the relationships of the above variables with achievement are in Volume II, pages 257-268.

6. *Teacher Ratings of Students*. Three of the five scales showed significant interactive relationships with achievement, and the patterns are similar to those reported for the Observer Ratings of Students. However, two of these interactions did not demonstrate clear relationships within each group:

05001, High student motivation

05005, Student displays appropriate behavior in the classroom

However, the teacher rating of student academic performance, compared to the rest of the class (05003), showed an interaction with a more steep positive slope for lower ability students. It is certainly sensible that teacher ratings of academic performance should correspond to student achievement at the end of the year, but it is interesting that this was only found for lower ability classes. Once again, this suggests that the concerns and interests that lower ability students bring into the classroom will have more of an effect on their achievement than would be the case for higher ability students. However, this was only true for English achievement, not for math achievement.

Tables presenting the relationships of the above variables with achievement are in Volume II, pages 276-278.

Summary

The English data are clearly much less satisfactory than the math data. The high-inference measures do not give us a clear picture of what an effective English teacher is like. In general, main effects were observed very rarely, and they did not form clearly interpretable patterns. Most of the observed main effects could be due to statistical chance. Interactions were much more common, but they were also often difficult to interpret.

The pattern of results seen here would tend to support the following conclusions:

1. We have no general recommendations about how to be an effective English teacher.
2. Our achievement test is of doubtful validity, perhaps because no one is quite sure what it is that English teachers are supposed to teach.
3. The large number of interactions implies that the needs of low ability classes are different from the needs of high ability classes.

We will return to each of the above conclusions in discussing other data sets. Each conclusion seems to be supported by the data to be presented in the following chapters.

TABLE 2.1

CLASSROOM OBSERVATION SCALES

```
HIGH LEVEL OF STUDENT ATTENTION

                                MEAN      SIGMA           RANGE           N
ID = 0.001      MATH            2.65        .83       .38 -  3.97        56
                ENGLISH         3.05        .56      1.03 -  4.00        78

TEACHER INITIATED PROBLEM SOLVING

                                MEAN      SIGMA           RANGE           N
ID = 0.002      MATH             .93        .69      0.00 -  3.27        56
                ENGLISH          .94        .55       .06 -  2.28        78

PUPIL-TO-PUPIL INTERACTION

                                MEAN      SIGMA           RANGE           N
ID = 0.003      MATH            2.17        .83       .10 -  3.89        56
                ENGLISH         2.81        .67       .46 -  3.07        78

TEACHER PRESENTATION OF ACADEMIC INFORMATION

                                MEAN      SIGMA           RANGE           N
ID = 0.004      MATH            1.42        .61       .10 -  2.32        56
                ENGLISH          .66        .40      0.00 -  1.62        78

NEGATIVE AFFECT (TEACHER AND STUDENTS)

                                MEAN      SIGMA           RANGE           N
ID = 0.005      MATH            1.12        .79       .05 -  2.88        56
                ENGLISH          .99        .58      0.00 -  2.42        78

POSITIVE AFFECT (TEACHER)

                                MEAN      SIGMA           RANGE           N
ID = 0.006      MATH            1.59        .63       .60 -  3.10        56
                ENGLISH         1.92        .72       .35 -  3.61        78

HIGHER COGNITIVE LEVEL STUDENT BEHAVIOR

                                MEAN      SIGMA           RANGE           N
ID = 0.007      MATH            1.11        .68       .07 -  3.13        56
                ENGLISH         1.03        .59      0.00 -  2.87        78
```

Table 2.1 (cont.)

```
PASSIVE PUPIL BEHAVIOR
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH           .89        .73      0.00 -  3.14       56
                    ENGLISH        .65        .51      0.00 -  2.29       78

CONVERGENT EVALUATIVE INTERACTIONS (TEACHER PROBES FOR RIGHT ANSWER)
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH          1.36        .64       .27 -  2.71       56
                    ENGLISH       1.20        .58       .15 -  2.82       78

TEACHER TASK ORIENTATION
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH          2.63        .69       .90 -  3.84       56
                    ENGLISH       2.74        .58      1.40 -  3.75       78

CLARITY OF TEACHER PRESENTATIONS
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH          2.67        .59      1.09 -  3.74       56
                    ENGLISH       2.92        .39      1.92 -  3.69       78

TEACHER ENTHUSIASM
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH          1.97        .55       .55 -  3.05       56
                    ENGLISH       2.25        .54       .70 -  3.03       78

RANDOM QUESTIONING; MEMORY QUESTIONS; FACT RELATED QUESTIONS
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH           .43        .26      0.00 -  1.02       56
                    ENGLISH        .40        .21      0.00 -  1.00       78

HIGHER LEVEL COGNITIVE QUESTIONS; SYNTHESIS, WHY QUESTIONS
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH           .58        .31      0.00 -  1.00       56
                    ENGLISH        .55        .24      0.00 -  1.00       78

QUESTIONS W/ APPLICATION TO STUDENTS PERSONAL LIVES; PERSONAL
QUESTIONS
                                  MEAN      SIGMA           RANGE          N
ID = [illegible]    MATH           .18        .17      0.00 -   .72       56
                    ENGLISH        .10        .24      0.00 -  1.00       78
```

Table 2.1 (cont.)

```
FACTOR 1:  ATTENTION, CLARITY, ACTIVITY
                              MEAN     SIGMA          RANGE          N
ID = 4,V20      MATH         47.66      9.61     25.00 - 65.00      56
                ENGLISH      51.29      6.58     31.00 - 63.00      78

FACTOR 2:  POSITIVE AFFECT, ENTHUSIASM
                              MEAN     SIGMA          RANGE          N
ID = 4,V21      MATH         47.42      7.25     33.00 - 63.00      56
                ENGLISH      51.63      7.45     35.00 - 69.00      78

FACTOR 3:  QUESTIONING, EVALUATION
                              MEAN     SIGMA          RANGE          N
ID = 4,V22      MATH         50.77      8.05     31.00 - 64.00      56
                ENGLISH      48.99      6.67     32.00 - 63.00      78

FACTOR 4:  PUPIL INTERACTION/TEACHER PRESENTATION
                              MEAN     SIGMA          RANGE          N
ID = 4,V23      MATH         49.19      9.06     29.00 - 69.00      56
                ENGLISH      51.17      6.32     39.00 - 65.00      78
```

Table 2.2: Reliability Correlations of Coder Ratings of Teachers (Decimal Points Omitted)

Question #*	Variable #**	Variable Name	r	N	p
1	02001	Patience in correcting errors	39	133	.000
2	02002	Attractiveness of room	20	132	.022
3	02003	Effective management and control	[illegible]	136	.000
5	02004	Crowding in room	[illegible]	134	.005
6	02005	Democratic leadership style	37	132	.000
7	02006	Talk among students in class	27	136	.002
8	02007	Teacher's stress on form	19	135	.025
9	02008	Student obedience to teacher	63	136	.000
10	02009	Quantity of directions for seatwork, homework	24	135	.006
11	02010	Interruptions	49	136	.000
12	02011	Use of students in performing some functions	36	79	.001
14	02012	Has seating arrangement	22	136	.011
15	02013	Rearranges seating often	23	107	.015
16	02014	Consistently enforces classroom rules	33	136	.000
17	02015	Grants student requests for restroom, fountain	23	133	.008
18	02016	Time it takes for class to begin after bell	22	136	.010
19	02017	Explanations involved in dealing with behavior problems	41	134	.000
21	02018	Amount of disturbance that is tolerated	-01	134	.952
22	02019	Teacher confusion	23	136	.000
23	02020	Correction of minor misbehaviors	26	134	.003

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* See Appendix A

**See Chapters 2 and 4, also Volumes II and [illegible]

Table 2.2 (cont.)

Question #	Variable #	Variable Name	r	N	p
24	02021	Monitors class regularly	32	136	.000
25	02022	Efficiency of transitions	38	133	.000
41	02023	Typical affectionateness	30	136	.001
42	02024	Range of affectionateness (low)	42	136	.000
43	02025	Range of affectionateness (high)	24	136	.000
44	02026	Solidarity with the group	32	136	.000
45	02027	Teacher anxiety	45	134	.000
46	02028	Confidence	58	135	.000
48	02029	Teacher enthusiasm	43	133	.000
49	02030	Student respect for teacher	55	136	.000
50	02031	Deals with student personal problems	50	116	.000
51	02032	Socializing with students	47	136	.000
53	02033	Teacher awareness of coder	38	136	.000
54	02034	Teacher credibility	44	136	.111
55	02035	Showmanship	40	136	.000
56	02036	Encouragement to students in academic matters	45	135	.000
58	02037	Reconciles angry, fighting students	11	98	.294
59	02038	Nurtures students' affective skills	46	134	.000
81	02039	Variety in assignments	37	136	.000
83	02040	Use of self-paced work	39	135	.000
84	02041	Use of blackboard for lecture, demonstration	52	136	.000
85	02042	Use of audio-visual aids	36	136	.000
86	02043	Use of oral reading	46	136	.000
87	02044	Use of drama	33	129	.000
88	02045	Productive use of own mistakes	32	106	.001

Table 2.2 (cont.)

Question #	Variable #	Variable Name	r	N	p
89	02046	Teacher goes to student during seatwork	52	136	.000
92	02047	Student eagerness for response opportunities	34	132	.000
97	02048	% Public response opportunity discussion	35	.36	.000
98	02049	% Task oriented seatwork	22	136	.010
99	02050	Amount of teacher preparation	41	136	.000
100	02051	Dealing with LD children	40	63	.001
101	02052	Teacher's overall academic effectiveness	59	134	.000
102	02053	Frequency of homework	45	124	.000
104	02054	% Productive work	48	134	.000
105	02055	Teacher emphasis on grades	18	129	.035
107	02056	Teacher concern for academic achievement	37	135	.000
108	02057	% Lecture	39	135	.000
110	02059	% Interactive class discussion	33	135	.000
111	02060	Command of subject matter	43	135	.000
112	02061	Difficulty level of questions	21	134	.016
113	02062	Consistently plans enough work	25	134	.004
114	02063	Follows up on homework, seatwork	24	130	.006
115	02064	Coder would sign up for this teacher	65	135	.000

02065 Factor 1: Effective teacher organization, control

	Containing variables:	Loadings
02003	Effectiveness of management methods	.90
02007	Talk among students in class	-.62
02009	Student obedience to teacher	.92

Table 2.2 (cont.)

Variable #	Variable Name	Loadings
02011	Classroom interruptions	-.83
02016	Consistent enforcement of rules	.88
02018	Time for class to begin	-.63
02021	Amount of disturbance tolerated	-.87
02024	Monitoring the class	.75
02025	Efficiency of transitions	.84
02049	Student respect for the teacher	.64
02101	Academic effectiveness of teacher	.65
02104	Time spent in productive work	.79
02066	Factor 2: Orientation to students' personal affective needs; solidarity with group	
	Containing variables:	
02001	Patience in correcting errors	.69
02006	Democratic leadership style	.67
02008	Teacher's stress on form	-.55
02023	Correction of minor misbehaviors	-.56
02041	Typical affectionateness	.81
02042	Affectionate range -- low end	.53
02043	Affectionate range -- high end	.82
02044	Solidarity with group	.88
02048	Teacher enthusiasm	.64
02050	Deals with student personal problems	.78
02051	Socializing with students	.78
02055	Showmanship	.53
02056	Encouragement in academic matters	.55
02058	Receptive to student input	.53
02059	Nurturance of affective skills	.72
02088	Productive use of own mistakes	.60
02092	Student eagerness for response opportunities	.43
02067	Factor 3: Seatwork vs. discussion	
02097	Public response opportunities discussion	-.76
02098	Task-oriented seatwork	.68
02109	Style as primarily seatwork	.84
02110	Style as primarily class discussion	-.84
02068	Factor 4: Use of oral reading and drama	
02086	Use of oral reading	.85
02087	Use of drama	.74
02069	Factor 5: Teacher competence, confidence	
02022	Teacher confusion	-.86
02046	Teacher confidence	.71
02054	Teacher credibility	.64
02099	Amount of preparation	.58
02111	Command of subject matter	.79

Table 2.3: Reliability Correlations of Coder Ratings of Target Students

Variable #	Variable Name	r	N	p
03001	Extroversion	.44	1394	<.001*
03002	Obedience to teacher	.44	1388	
03003	Confidence	.25	1206	
03004	Bad work habits	.41	1333	
03005	Degree of interaction with teacher	.32	1372	
03006	Shoddy appearance	.23	1392	
03007	Academic dependence on teacher	.25	1331	
03008	Emotional maturity	.32	1359	
03009	Achievement motivation	.44	1294	
03010	Calmness	.31	1377	
03011	Unhappy	.25	1371	
03012	Academic achievement	.48	1203	
03013	Physical maturity	.46	1385	
03014	Lacks persistence	.37	1198	
03015	Class participation	.33	1309	
03016	Good peer relations	.36	1364	
03017	Good relationship with teacher	.32	1351	
03018	Level of aggression high	.36	1327	
03019	Lacks dependability	.45	1308	
03020	Talks during class	.36	1383	
03021	Lack of cooperativeness	.25	1207	
03022	Behavior problems in class	.44	1381	
03023	Athletic ability	.36	1269	
03024	Use of profane language	.20	1197	
03025	Academic peer leadership	.35	1267	

Table 2.3 (cont.)

Variable #		Loadings
03027	Factor 1: Low achievement motivation, interest; poor work habits	
	Containing variables:	
03003	Confidence of student	-.85
03004	Bad work habits	.74
03007	Academic dependence on teacher	.65
03009	Achievement motivation	-.77
03012	Academic achievement level	-.88
03014	Lacks persistence	.76
03019	Lacks dependability	.68
03025	Peer leader in academic matters	-.82
03028	Factor 2: Charisma (outgoing, sociable, happy) with peers and teacher	
03001	Extroversion	.77
03005	Degree of interaction with teacher	.73
03011	Usually unhappy	-.76
03015	Class participation	.67
03016	Good peer relations	.72
03020	Talk during class	.67
03039	Factor 3: Physical, athletic development	
03013	Physical maturity	.75
03023	Athletic ability	.70
03030	Factor 4: Students with antisocial tendencies; emotional or behavioral problems in class	
03002	Obedience	-.79
03006	Shoddy appearance	.47
03008	Emotional maturity	-.53
03010	Calmness	-.62
03017	Good relationship with teacher	-.74
03018	Level of aggression	.71
03021	Lack of cooperativeness	.81
03022	Behavior problems	.78
03024	Use of profane language	.55

*p < .001 for all variables

TABLE 2.4

STUDENT RATINGS OF TEACHERS

```
STUDENTS THINK THE TEACHER KNOWS THE SUBJECT WELL

                               MEAN      SIGMA          RANGE          N
ID = 00001      MATH           3.53        .32      2.93 -  4.00      56
                ENGLISH        3.55        .35      2.17 -  4.00      78

STUDENTS THINK THE TEACHER IS ALWAYS WELL PREPARED AND ORGANIZED

                               MEAN      SIGMA          RANGE          N
ID = 00002      MATH           2.91        .51       .91 -  3.78      56
                ENGLISH        3.06        .52       .95 -  4.00      78

STUDENTS THINK THE TEACHER ENJOYS TEACHING

                               MEAN      SIGMA          RANGE          N
ID = 00003      MATH           2.95        .42      1.70 -  3.61      56
                ENGLISH        3.41        .48      1.55 -  3.91      78

STUDENTS THINK TEACHER HAS INTEREST IN KNOWING CLASS AS WELL AS TEACHING

                               MEAN      SIGMA          RANGE          N
ID = 00004      MATH           2.74        .53      1.62 -  3.59      56
                ENGLISH        2.94        .64      1.36 -  3.85      78

STUDENTS FEEL COMFORTABLE ASKING QUESTIONS OR ASKING FOR HELP

                               MEAN      SIGMA          RANGE          N
ID = 00005      MATH           2.75        .49      1.23 -  3.67      56
                ENGLISH        2.85        .63       .87 -  3.91      78

STUDENTS FEEL COMFORTABLE ABOUT GOING TO TEACHER WITH A PERSONAL PROBLEM

                               MEAN      SIGMA          RANGE          N
ID = 00006      MATH           1.35        .55       .20 -  2.74      56
                ENGLISH        1.78        .73       .25 -  2.96      78

STUDENTS FEEL THEY HAVE LEARNED A GREAT DEAL IN THE CLASS

                               MEAN      SIGMA          RANGE          N
ID = 00007      MATH           3.04        .39      2.34 -  3.80      56
                ENGLISH        3.06        .47      1.56 -  3.82      78
```

Table 2.4 (cont.)

```
STUDENTS HAVE ENJOYED THE CLASS

                             MEAN      SIGMA         RANGE          N
ID = 00048      MATH         2.72        .52     1.67 -  3.67      56
                ENGLISH      2.77        .72     1.23 -  3.88      78

STUDENTS WOULD ASK FOR THIS TEACHER AGAIN NEXT YEAR

                             MEAN      SIGMA         RANGE          N
ID = 00049      MATH         2.41        .69      .95 -  3.70      56
                ENGLISH      2.66        .89      .85 -  3.82      78

FACTOR 1: GENERALIZED LIKING OF TEACHER

                             MEAN      SIGMA         RANGE          N
ID = 00410      MATH        48.41       4.80    32.30 - 55.94      56
                ENGLISH     50.73       6.02    31.01 - 59.25      78

FACTOR 2: (FEMALES ONLY) STUDENT VIEW OF TEACHER COMPETENCY

                             MEAN      SIGMA         RANGE          N
ID = 00411      MATH        48.90       5.80    30.00 - 58.13      56
                ENGLISH     50.49       6.58    17.00 - 58.29      78

FACTOR 3: (MALES ONLY) STUDENT VIEW OF TEACHER COMPETENCY

                             MEAN      SIGMA         RANGE          N
ID = 00412      MATH        49.77       5.15    28.33 - 56.33      56
                ENGLISH     50.20       5.06    26.03 - 59.00      78

FACTOR 4: (FEMALES ONLY) FAVORABLE TEACHER/STUDENT RELATIONSHIPS

                             MEAN      SIGMA         RANGE          N
ID = 00413      MATH        48.95       5.08    36.82 - 57.67      56
                ENGLISH     50.58       7.20    34.44 - 61.56      78
```

TABLE 2.5

TEACHER RATINGS OF TARGET STUDENTS

```
HIGH STUDENT MOTIVATION, COMPARED TO REST OF CLASS

                                   MEAN     SIGMA          RANGE          N
ID = #5001      MATH               2.41       .56     1.00 -  3.60       56
                ENGLISH            2.41       .46     1.08 -  3.40       78

TEACHER WOULD WANT THE STUDENT IN HIS/HER CLASS AGAIN

                                   MEAN     SIGMA          RANGE          N
ID = #5002      MATH               2.94       .67     1.46 -  4.00       56
                ENGLISH            2.93       .58     1.30 -  4.00       76

HIGH STUDENT ACADEMIC PERFORMANCE, COMPARED TO REST OF CLASS

                                   MEAN     SIGMA          RANGE          N
ID = #5003      MATH               2.30       .53     1.40 -  3.45       56
                ENGLISH            2.43       .46     1.55 -  3.67       78

STUDENT TURNS IN HOMEWORK ON TIME

                                   MEAN     SIGMA          RANGE          N
ID = #5004      MATH               2.43       .53     1.30 -  3.67       54
                ENGLISH            2.44       .50     1.33 -  3.80       78

STUDENT DISPLAYS APPROPRIATE BEHAVIOR IN CLASS

                                   MEAN     SIGMA          RANGE          N
ID = #5005      MATH               2.57       .46     1.70 -  3.92       56
                ENGLISH            2.56       .51     1.00 -  3.64       78
```

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TABLE 2.6

CODER CLASSROOM DESCRIPTIONS

```
TEACHER REACTS POSITIVELY TO STUDENT FEELINGS

                             MEAN      SIGMA          RANGE          N
ID = 11001     MATH          6.18       3.27      1.00 -  9.00      11
               ENGLISH       6.00       3.10      1.00 -  9.00      22

TEACHER ACTIVELY LISTENS TO STUDENTS IN READING, RECITING, ETC.

                             MEAN      SIGMA          RANGE          N
ID = 11002     MATH          6.33       3.77      1.00 -  9.00       9
               ENGLISH       5.71       3.08      1.00 -  9.00      14

TEACHER BERATES OR PUTS DOWN STUDENT IN FRONT OF OTHERS

                             MEAN      SIGMA          RANGE          N
ID = 11003     MATH          5.40       3.32      1.00 -  9.00      20
               ENGLISH       6.00       2.45      1.00 -  9.00      17

WHEN TEACHER MAKES A THREAT, IT IS FOLLOWED OUT

                             MEAN      SIGMA          RANGE          N
ID = 11004     MATH          4.77       3.47      1.00 -  9.00      35
               ENGLISH       3.55       2.63      1.00 -  9.00      33

WARM, FAMILY-LIKE FEELING IN CLASSROOM; POSITIVE FEELINGS AMONG CLASS

                             MEAN      SIGMA          RANGE          N
ID = 11005     MATH          5.33       3.23      1.00 -  9.00      27
               ENGLISH       7.13       2.34      1.00 -  9.00      45

STUDENTS COOPERATE WITH OTHERS AND TEACHER

                             MEAN      SIGMA          RANGE          N
ID = 11006     MATH          5.43       3.38      1.00 -  9.00      37
               ENGLISH       6.61       3.07      1.00 -  9.00      33

TEACHER INVOLVES STUDENTS IN DECISION MAKING ABOUT CLASS STANDARDS

                             MEAN      SIGMA          RANGE          N
ID = 11007     MATH          4.67       2.43      1.00 -  9.00       6
               ENGLISH       5.42       2.56      1.00 -  9.00      19
```

Table 2.6 (cont.)

```
TEACHER ENCOURAGES STUDENT EFFORT; GIVES SUPPORT FOR WORK

                                MEAN      SIGMA          RANGE           N
ID = 1,409      MATH            5.93       2.99     1.00 -  9.00        27
                ENGLISH         6.81       2.46     1.00 -  9.00        43

TEACHER DIVIDES TIME AND ATTENTION AMONG ALL STUDENTS

                                MEAN      SIGMA          RANGE           N
ID = 1,410      MATH            4.79       3.03     1.00 -  9.00        28
                ENGLISH         8.61       2.90     1.00 -  9.00        31

TEACHER FILLS EMPTY TIME WITH BUSY WORK

                                MEAN      SIGMA          RANGE           N
ID = 1,411      MATH            5.44       3.50     1.00 -  9.00         9
                ENGLISH         6.54       2.97     1.00 -  9.00        24

TEACHER ADJUSTS INSTRUCTION SCHEDULE TO BE FLEXIBLE

                                MEAN      SIGMA          RANGE           N
ID = 1,412      MATH            7.33       2.18     3.00 -  9.00        15
                ENGLISH         6.56       2.54     1.00 -  9.00        18

TEACHER ASSIGNS LEARNING TASKS TO MATCH INDIVIDUAL ABILITIES/INTERESTS

                                MEAN      SIGMA          RANGE           N
ID = 1,413      MATH            5.70       3.14     1.00 -  9.00        33
                ENGLISH         6.81       2.78     1.00 -  9.00        47

TEACHER SEEMS TO ENJOY TEACHING

                                MEAN      SIGMA          RANGE           N
ID = 1,415      MATH            6.56       3.50     1.00 -  9.00        18
                ENGLISH         6.37       2.58     1.00 -  9.00        30

TEACHER SEEMS TO KNOW CONTENT OF SUBJECT MATTER

                                MEAN      SIGMA          RANGE           N
ID = 1,416      MATH            7.33       2.51     1.00 -  9.00        33
                ENGLISH         7.23       2.25     1.00 -  9.00        31

STUDENTS MOVE AROUND ROOM FREELY

                                MEAN      SIGMA          RANGE           N
ID = 1,417      MATH            7.30       2.00     3.00 -  9.00        30
                ENGLISH         7.23       2.62     1.00 -  9.00        35
```

Table 2.6 (cont.)

```
TEACHER MOVES FREELY AROUND ROOM

                         MEAN      SIGMA          RANGE          N
ID = 11018   MATH        6.98       2.85     1.00 -  9.00       53
             ENGLISH     6.19       2.90     1.00 -  9.00       63

TEACHER CHECKS ON STUDENT PROGRESS PERIODICALLY

                         MEAN      SIGMA          RANGE          N
ID = 11019   MATH        6.76       2.09     1.00 -  9.00       41
             ENGLISH     7.77       1.76     3.00 -  9.00       43

TEACHER ACKNOWLEDGES STUDENTS FEELINGS BOTH POSITIVE AND NEGATIVE

                         MEAN      SIGMA          RANGE          N
ID = 11020   MATH        5.41       3.52     1.00 -  9.00       17
             ENGLISH     5.07       3.17     1.00 -  9.00       18

TEACHER PERCEIVES STUDENT LEARNING RATES AND ADJUSTS LEARNING PACE

                         MEAN      SIGMA          RANGE          N
ID = 11021   MATH        5.45       3.22     1.00 -  9.00       33
             ENGLISH     6.04       3.23     1.00 -  9.00       25

TEACHER EMPHASIZES QUIETNESS, ORDERLINESS, AND GOOD BEHAVIOR

                         MEAN      SIGMA          RANGE          N
ID = 11022   MATH        6.09       2.79     1.00 -  9.00       41
             ENGLISH     5.65       2.27     1.00 -  9.00       57

TEACHER ENCOURAGES STUDENTS TO TAKE RESPONSIBILITY FOR THEIR OWN WORK

                         MEAN      SIGMA          RANGE          N
ID = 11024   MATH        5.83       3.01     1.00 -  9.00       28
             ENGLISH     6.49       2.53     1.00 -  9.00       36

TEACHER PREPARES STUDENTS FOR LESSON BY REVIEWING, OUTLINING,
SUMMARIZING
                         MEAN      SIGMA          RANGE          N
ID = 11025   MATH        6.98       2.24     1.00 -  9.00       42
             ENGLISH     7.63       1.98     1.00 -  9.00       52

TEACHER SEEKS CONTACT WITH STUDENTS, TALKS WITH, AND SHOWS AFFECTION
FOR
                         MEAN      SIGMA          RANGE          N
ID = 11026   MATH        5.92       2.56     1.00 -  9.00       36
             ENGLISH     6.48       2.45     1.00 -  9.00       52
```

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Table 2.6 (cont.)

```
TEACHER SEEMS PREPARED FOR CLASS

                               MEAN      SIGMA          RANGE            N
ID = 11827      MATH           6.39      3.18       1.00 -  9.00        44
                ENGLISH        6.81      2.93       1.00 -  9.00        53

CLASSROOM IS WELL-DECORATED, CLEAN AND INTERESTING

                               MEAN      SIGMA          RANGE            N
ID = 11828      MATH           4.00      2.54       1.00 -  9.00        22
                ENGLISH        7.94      2.38       1.00 -  9.00        19

STUDENTS RESPECT THE TEACHER

                               MEAN      SIGMA          RANGE            N
ID = 11829      MATH           5.30      3.33       1.00 -  9.00        33
                ENGLISH        6.33      3.13       1.00 -  9.00        33

TEACHER IS IN CONTROL OF THE CLASS AND MAINTAINS ORDER

                               MEAN      SIGMA          RANGE            N
ID = 11830      MATH           4.89      2.95       1.00 -  9.00        55
                ENGLISH        5.90      2.70       1.00 -  9.00        72

TIME IS SPENT IN ACTIVITIES SUCH AS OFF-TASK TALKING, FOOLING AROUND

                               MEAN      SIGMA          RANGE            N
ID = 11831      MATH           6.53      2.71       1.00 -  9.00        45
                ENGLISH        6.78      2.85       1.00 -  9.00        64

OBSERVERS OVERALL POSITIVE EVALUATION OF THE TEACHER

                               MEAN      SIGMA          RANGE            N
ID = 11832      MATH           5.35      2.56       1.00 -  9.00        56
                ENGLISH        5.72      1.96       2.00 -  9.00        78

TIME SPENT IN NON-ACADEMIC TASKS;PAPERWORK;CHECKING PAPERS;RUNNING
ERRANDS
                               MEAN      SIGMA          RANGE            N
ID = 11833      MATH           6.31      2.22       3.00 -  9.00        51
                ENGLISH        6.78      2.32       1.00 -  9.00        65

ENTIRE CLASS RESPONDS IN UNISON TO ACADEMIC RESPONSE OPPORTUNITIES

                               MEAN      SIGMA          RANGE            N
ID = 11834      MATH           6.04      2.79       1.00 -  9.00        26
                ENGLISH        6.17      2.50       3.00 -  9.00        30
```

Table 2.7: Summary of Important Results: Relationships between High-inference Process Variables and Student Achievement

Table 2.7 contains the statistically significant results from the five sets of high-inference variables, described on pages 35-37. Those results which fit into interpretable patterns are discussed in the text of the chapter.

The table is divided into sections, as follows:

Section	Page
1. Classroom management	83
a. General descriptions	83
b. Student behaviors	83
c. Specific indications of management	83
2. Personal, social and affective characteristics	84
a. Overall evaluation of teacher	84
b. Personal characteristics of the teacher	85
c. Personal characteristics of the students	85
d. Teacher-student relationships	86
e. Student ratings of the teacher	86
3. Academic styles and techniques	88
a. Questioning techniques, class discussions	88
b. Use of individualized instructional techniques	89
c. Emphasis on academic work	89
d. Teacher characteristics	90
e. Student characteristics	90

n.s. = not significant. There was no statistically significant relationship between the classroom behavior and achievement gains in that subject

+ = positive relationship. There was a significant positive association between the classroom behavior and achievement gains in that subject.

- = negative relationship. There was a significant negative association between that classroom behavior and achievement gains in that subject.

I = interaction. The relationship between the classroom behavior and achievement gains in that subject was significantly different for low and high ability classes.

When there is an interaction, the separate relationships for low and high ability classes are listed in the adjacent columns. A + or - (without parentheses) indicates that the slope of the regression line for that variable and ability level exceeded our criterion for practical significance (.40 A-score units difference in adjusted gain for high and low levels of the behavior). A (+) or (-) (in parentheses) indicates that the slope of the regression line did not exceed our criterion for practical significance.

Results for both math and English, and for both rate and proportion variables are listed together in each section. At the end of each section is a list of variables that were related to achievement in a statistically significant manner but not discussed separately in the text. Additional information on those variables is available in Tables 3.1 and 3.2, and in the Tables in Volume II.

Table 2.7: Significant Relationships Between High-inference Measures and Adjusted Achievement Scores

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
CLASSROOM MANAGEMENT (1.)						
General Descriptions (1.a.)						
02003 Effectiveness of teachers' management methods			+	ns		
02065 Factor 1: Effective organization, control			+	ns		
11022 Teacher emphasizes quietness, orderliness, and good behavior			ns	+		
11030 Teacher is in control of the class and maintains order			+	ns		
Student Behaviors (1.b.)						
02008 Student obedience to teacher			+	ns		
03002 Student is obedient, does not defy the teacher			+	ns		
11029 Students respect the teacher			+	ns		
03022 Student has behavior problems, disrupts class frequently			-	I	(-)	(+)
03020 Student is continually talking to neighbors	-	(+)	I	ns		
03005 Student is constantly being attended to be teacher	(-)	+	I	ns		
05005 Student displays appropriate behavior in class			ns	I	(+)	(-)
Specific Indications of Management (1.c.)						
02004 Crowdedness of classroom			ns	+		
02014 Consistency of enforcement of rules			+	ns		
11004 When teacher makes a threat, it is followed out			+	ns		

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Specific Indications of Management (l.c.) cont.						
02021 Monitoring of class			+	ns		
02022 Efficiency of transition during the class period			+	ns		
02017 Teacher uses explanations to solve behavior problems			ns	+		
02010 Classroom interruptions			-	ns		
02015 Teacher grants request to go to restrooms or water fountain	(-)	-	I, -	ns		
02012 Teacher has seating arrangement	(-)	+	I	I	(+)	-
02013 Frequency of seating arrangement changes			-	ns		
02016 Length of time after bell for class to begin	(+)	-	I, -	ns		
02018 Amount of disturbance teacher accepts			-	ns		
11031 Time is spent in activities such as off-task talking, fooling around			-	ns		
PERSONAL, SOCIAL, AND AFFECTIVE CHARACTERISTICS (2.)						
Overall Evaluation of Teacher (2.a.)						
02064 Coder, if 7th or 8th grader, would choose this teacher			+	ns		
02069 Factor 5: Teacher competence, confidence			+	ns		
11032 Observers' overall positive evaluation of teacher			+	ns		

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Personal Characteristics of the Teacher (2.b.)						
02028 Teacher confidence level	+	(+)	I, +	ns		
02034 Teacher credibility			+	ns		
02066 Factor 2: Orientation to student needs			+	ns		
02029 Teacher enthusiasm			+	ns		
02031 Deals effectively with student personal problems			+	ns		
11015 Teacher seems to enjoy teaching			+	ns		
01021 Factor 2: Teacher positive affect; enthusiasm			+	ns		
11026 Teacher seeks contact with students; talks with; shares affection for			ns	I	(+)	(-)
Personal Characteristics of the Students (2.c.)						
03001 Student is very outgoing or extroverted			ns	I	-	(+)
03003 Student is highly confident in academic work			ns	I	(+)	(-)
03012 Student does good work and gets good grades			ns	I	(+)	(-)
03016 Student has good peer relations	+	-	I	-		
03018 Student has chip on shoulder and engages in physical or verbal abuse			-	ns		
03021 Student lacks cooperativeness, shows no desire to work with others, etc.			-	ns		
03013 Student is physically mature			ns	-		

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Personal Characteristics of the Students (2.b.) cont.						
03023 Student has athletic ability			ns	I, -	-	(+)
03028 Factor 3: Physical, athletic development			ns	I, -	-	(+)
03024 Student uses profanity often	-	(+)	I	I, -	(-)	(+)
03025 Student displays academic peer leadership			ns	I	(+)	(-)
Teacher-student Relationships (2.d.)						
01005 Negative affect (teacher and students)	(+)	-	I	ns		
02030 Student respect for teacher			+	ns		
03017 Student has good relationship with teacher			+	ns		
11001 Teacher reacts positively to student feelings			+	ns		
11005 Warm, family-like feeling to classroom; positive feelings among class			+	ns		
11006 Students cooperate with others and teacher			+	I	+	-
11010 Teacher divides time and attention among all students			+	ns		
11020 Teacher acknowledges students' feelings, both positive and negative			+	ns		
Student Ratings of Teachers (2.e.)						
04001 Students think the teacher knows the subject well			+	ns		

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Student Ratings of Teachers (2.e.)						
04002 Students think the teacher is always well-prepared and organized			+	I	-	(+)
04003 Students think the teacher enjoys teaching			+	I	-	(+)
04004 Students think the teacher has interest in knowing the class as well as in teaching			ns	I	-	(+)
04005 Students feel comfortable asking questions or asking for help			ns	I	-	(+)
04006 Students feel comfortable about going to teacher with a personal problem			ns	I	-	(+)
04007 Students feel they have learned a great deal in the class			+	ns		
04009 Students would ask for this teacher again			+	I	(-)	(+)
04010 Factor 1: Generalized liking of the teacher			+	I	-	(+)
04011 Factor 2: (Females only) Student view of teacher competency			+	I	(-)	(+)
04012 Factor 3: (Males only) Student view of teacher competency	(+)	+	I, +	ns		
04013 Factor 4: (Females only) Favorable teacher/student relationships			+	I	-	(+)
04014 Factor 5: (Males only) Favorable teacher/student relationships			ns	I	-	(+)

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Teacher Ratings of Target Students (2.e.)						
05001 High student maturation, compared to rest of class			ns	I	(+)	(-)
ACADEMIC STYLES AND TECHNIQUES (3.)						
Questioning Techniques, Class Discussion (3.a.)						
01002 Teacher initiated problem solving			+	ns		
01004 Teacher presentation of academic information	(-)	+	I	ns		
01007 Higher cognitive level student behavior			+	ns		
01013 Random questioning; memory questions; fact-related questions			+	ns		
01015 Questions with application to students' lives; personal questions			+	ns		
0101 Higher level cognitive questions: synthesis, why questions			+	ns		
02048 Time allotted for class discussion	(+)	+	I, +	ns		
02051 Teacher attention to learning disabled students or slow learners			ns	I	(+)	(-)
02059 Teacher primarily uses class discussion			+	ns		
02067 Factor 3: High use of class discussion vs. seatwork			+	ns		
02037 Receptiveness to student input			+	ns		
01023 Factor 4: Pupil interaction (vs. teacher presentation)	(+)	-	I	ns		
02041 Teacher use of blackboard for lectures and discussions			+	ns		

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Questioning Techniques, Class Discussion (3.a.) cont.						
03015 Student participates in class			+	ns		
01011 Clarity of teacher presentations			+	ns		
01022 Factor 3: Questioning; evaluation			+	ns		
Use of Individualized Instructional Techniques (3.b.)						
02039 Variety and choice in assignments			-	ns		
02040 Teacher use of self-paced work			-	ns		
11014 Teacher assigns learning tasks to match individual abilities/interests			-	ns		
11021 Teacher perceives student learning rates and adjusts learning pace			ns	-		
Emphasis on Academic Work (3.c.)						
01010 Teacher task orientation			+	ns		
02036 Academic encouragement given by teacher			+	ns		
02056 Teacher concern for academic achievement, grades			+	ns		
11009 Teacher encourages student effort; gives support for work			+	ns		
11023 Teacher encourages students to take responsibility for their own work			+	ns		
02053 Frequency of homework			ns	I	+	(-)
02054 Amount of class time spent in productive work			+	ns		
02063 Teacher consistently gives feedback on assigned work			ns	I	-	(-)

Table 2.7 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
Emphasis on Academic Work (3.c.) cont.						
11011 Teacher fills empty time with busy work			-	ns		
02058 Teacher primarily assigns seatwork			-	ns		
Teacher Characteristics (3.d.)						
01020 Factor 1: Attention, clarity, activity			+	ns		
02050 Amount of teacher preparation			+	ns		
02052 Teacher academic effectiveness			+	ns		
Student Characteristics (3.e.)						
03009 Student is highly motivated and and eager			+	I	+	(-)
05003 High student academic performance, compared to rest of class			ns	I	+	(-)
03004 Student has bad work habits, short attention span, unprepared to respond			-	I	(-)	(+)
03014 Student lacks persistence			-	I	(-)	(+)
03019 Student is irresponsible, doesn't turn in work on time, comes without supplies			-	I	(-)	(+)
03026 Factor 1: Low achievement motivation, low interest, poor work habits			-	I	(-)	(+)

Chapter 3: Findings from Low-inference Measures for Cognitive Outcomes

In addition to the high-inference measures discussed in the previous chapter, low-inference data on classroom processes were collected by means of a complex coding system (Appendix C). Data from the coding system were used to produce the rate and proportion variables as described in Chapter 1. In this chapter, we will discuss the relationship between those low-inference classroom process measures and student achievement in English and math.

Of the 413 rate variables which were originally constructed to describe how often an event was observed during an average class period, 158 were deleted because of low incidence of occurrence or because of inadequate variance. The remaining 255 variables are listed in Table 3.1, along with the range of scores and means and standard deviations for both math and English classes. It should be noted that:

1. The numbers of all rate variables begin with 15.

2. The means and ranges represent the number of times that a behavior occurred during 50 minutes of observation time, which is about the length of a normal junior high school period. Thus, we see from variables 15001 and 15002 that the average math teacher asked about three process questions and 10 product questions in an average class period.

3. Even among the variables that were not deleted, many represent events which occurred very rarely in most classrooms (e.g., variables 15003 and 15004). These variables are obviously of much less practical significance than those which represent frequently occurring events.

Proportion variables were computed from rates to describe relative frequency. Thirty-seven of the 402 proportion variables were deleted due to inadequate variance. The remaining 365 are listed with their distributions and formulas in Table 3.2. It should be noted that:

1. The numbers of all proportion variables begin with 09.

2. The numbers in the formula for a proportion variable correspond to the last three digits of rate variables. Thus, the numerator for variable 09001 is the number of process questions (variable 15001) and the denominator is the sum of the numbers of all four types of questions (variables 15001, 15002, 15003, 15004).

3. The means and ranges represent the proportion of time that a certain event occurred. Thus we see from looking at variables 09001-09004 that the average math teacher asked about 17% process questions, 79% product questions, 3% choice questions and 1% opinion questions while working with the whole class.

4. Many proportion variables represent infrequent events. These variables are of less practical significance than variables that represent frequently occurring events. It is not always obvious from the range data which variables represent infrequently occurring events. For instance, variable 09007, "choice questions which students answered correctly," represents an infrequent event in spite of the apparently high mean of .84. The data for the corresponding rate variable (15007) show that correct answers to choice questions occurred only about once every four periods in the average math class. The mean on the variable appears to be high because choice questions, the denominator of the formula, were themselves infrequent.

In this chapter, the relationships with both English and math achievement are examined for a total of 620 rate and proportion variables. Since tests for both significant main effects and interactions with initial ability were performed, there are almost 2,500 F-tests to be discussed in this chapter. The sheer mass of data leads to two problems, one practical, the other methodological. As a practical matter, it is very difficult to examine the results of all 2,500 tests for significance when they extend for several hundred pages of Volume II. Therefore, summary tables have been compiled which present the most important results in shorter form. These are included at the end of the chapter.

The large number of F-tests leads to the methodological problem of chance significance. Perhaps 125 findings can be attributable to chance alone. (Although we cannot estimate the actual number because the F-tests were not independent.) Only a replication of the study could allow more confidence in the elimination of spurious results. However, we have tried to avoid discussion of results that seem to be spurious or of little practical significance. Results included in the summary tables and discussed in the text of this chapter are generally those that met all four of the following criteria:

1. The results of the F-test were significant at $p \leq .05$.

2. The results seemed to combine with other results to form a meaningful pattern.

3. The event represented by the variable occurred often enough to have some practical significance.

4. The regression lines had a slope steep enough to be of practical significance.

The fourth criterion applied to interactions only. If the difference between the projected achievement scores for teachers exhibiting high and low amounts (± SD) of the classroom behavior did not exceed .40 z-score units for at least one of the two plotted regression lines, we generally have not included the result in the summary tables or discussed it in this chapter. Occasionally, exceptions were made for results which seemed to be part of a strong and interesting pattern. When we discuss data which do not meet all four of the above criteria, it is noted in the summary tables and in the text.

Curvilinear relationships between process variables and student learning are presented in Volume II, Tables 17 (math achievement) and 18 (English achievement). These tables only include data on curvilinear relationships that reach the .05 level of significance. Less than 5% of the rate and proportion measures from the low inference coding showed significant curvilinear relationships with learning in either math or English, and only a few of these relationships seem interpretable with any confidence. Therefore, the data in Tables 17 and 18 will not be discussed systematically in this report, although they are presented for interested readers.

The remainder of this chapter is divided into two sections. Results are discussed first for math, then for English. Within each section, results are discussed in the following order:

1. The teachers' use of time in the classroom
2. Public contacts between the teacher and students
    a. Academic response opportunities (questions asked by the teacher), including:
        i. Types of questions
        ii. Selection of respondents
        iii. Quality of responses
        iv. Feedback to student responses

   b. Student initiated questions and comments (public questions and comments asked by students)

3. Private academic and procedural contacts between the teacher and students
4. Behavioral contacts between the teacher and students
5. Social contacts between the teacher and students
6. Summary and discussion of important results

Math Classes

This section will discuss significant relationships between process variables and student learning in math classes. These data are summarized in Table 3.3. Tables containing results for all process variables are contained in Volume II, pages 49-115 (proportion variables) and 156-233 (rate variables). Readers wishing more information about how specific events were recorded are referred to the coding manual (Appendix C).

1. Teachers' use of time in the classroom. The average class period lasted about 50 minutes. Within that time block, most classroom activity occurred in three of the 18 formats (15362-15381). These were individual seatwork (15366, mean = 23 minutes/period), lecture-demonstration (15370, mean = 10 minutes/period), and discussion (15371, mean = 6 minutes/period). Two of these types of activities showed significant relationships with math learning. Time spent in individual seatwork was negatively related to achievement and time spent in lecture-demonstration was positively related to achievement. Thus, the more successful teachers were the ones who spent relatively more time teaching the class as a whole (although not necessarily the majority of the time). This result is strongly supported by a number of other variables which will be presented

in later sections.

2a. Public academic response opportunities. The largest section of the coding system (over 270 variables) dealt with teacher questions addressed to the class, student responses to those questions, and feedback from the teacher to the students. Such response opportunities could occur in either a lecture-demonstration or a discussion format. As noted above, use of the lecture-demonstration format was positively associated with math achievement. It is to be expected, then, that rates of academic response opportunities should be positively associated with math achievement scores. This is in fact the case. Positive relationships with student achievement test scores were observed for the following major variables:

09384, (Proportion of) Dyadic contacts which were response opportunities

15393, Public response opportunities

15001, Response opportunities generated by process questions

15002, Response opportunities generated by product questions

15019, Correct answers

15020, Incorrect answers

Positive relationships with achievement for 22 other rate variables are part of the same pattern (15005, 15006, 15010, 15012, 15021, 15023, 15024, 15026, 15041, 15044, 15050, 15052, 15053, 15056, 15079, 15080, 15141, 15142, 15143, 15144, 15183, 15395). This pattern of relationships is so strong, in fact, that it prevents meaningful interpretation of most of the single rate variables connected with public response opportunities. The above variables will not be interpreted separately, and subsequent analyses in this section will depend heavily on proportion variables.

In addition to the sheer frequency of public recitations, the types of interactions that took place in those recitations were also important. A large number of categories were included in the coding system to capture possible types of teacher questions, student answers, and subsequent feedback, allowing for a more fine-grained analysis of interactions. The many variables involved will be divided into the following categories and discussed separately:

Types of questions

Selection of students to respond

Quality of student responses

Teacher feedback following student answers

Types of questions. Questions were placed in one of four categories (process, product, choice and opinion) (09001-09004). For all teachers in the sample the most frequently observed type of question was the product question, in which the student was required to give a relatively short answer such as a solution to a problem. Over three-fourths of all the questions observed were product questions. Most of the remaining questions were process questions, where students were asked to explain their reasoning at some length. Choice questions and opinion questions were observed infrequently.

The relative frequency of process questions calling for an explanation of the steps involved in arriving at an answer was positively associated with learning in math classes (09001), but the relative frequency of product questions seeking factual answers only was negatively associated (09002). Therefore, greater learning was associated with recitation that went beyond seeking factually correct answers to probing the thinking processes involved. This teaching style involves a lot of instruction directed both at the respondent and at other members of the class who are listening. Recitations that concentrate almost completely on getting the answer are less informative, looking more like an oral quiz than a method of instruction.

Selection of respondents to questions. Teachers' methods of selecting students to respond to questions were classified into one of five categories (09009-13, 09060-78). Teachers were rarely observed selecting students to respond before asking a question, either by use of patterned turns (about 2% of all response opportunities), or by calling the student's name in advance (3%). In general, the students selected to answer a question were nonvolunteers (45%), volunteers (21%), or students who called out their answers (28%).

Higher achievement was associated with recitation patterns in which teachers asked questions directed to the whole class and then called on volunteers to respond (09012, 09072, 09203, 09208). We believe that part of the reason for this relationship is that calling on volunteers allows the recitation to move along at a good pace. Volunteers usually know the answer and respond without hesitation. Also, volunteers wish to respond, so that teachers do not risk encountering student hostility or producing student embarrassment when they call on them. Finally, teacher ability to motivate students and to match difficulty level of questions to student readiness to respond may be involved here, too. Perhaps the students in the classes of more successful teachers were generally more willing to respond, in comparison to students in other classes in which case the rate of volunteering may be a short-term outcome that is not causally related to achievement. Rather, both high rates of volunteering and higher achievement test scores are the results of a teaching style which creates interest and enthusiasm.

These relationships for calling on student volunteers contrast with our earlier findings at the second- and third-grade level (Brophy & Evertson, 1976; Note 2). We believe that both sets of relationships were valid and reflect important differences between early elementary schools and junior high school. Older students can learn from hearing other students, especially if the lesson is well-paced and interesting. However, there is much evidence to indicate that younger students need to receive opportunities to answer aloud, and learn less well from hearing someone else practice. Therefore, young children are taught in small groups much of the time, and in this setting, going around the group in a predetermined patterned order is a feasible strategy and one that appears to be more efficienct than calling on volunteers. However, for junior high students in large group settings, ordered turns are much less appropriate, since it is probably more important for junior high teachers to keep moving at a good pace than to give each individual student an opportunity to practice. Calling on volunteers is an efficient way to do this.

Other findings indicate a positive relationship for incorrect answer given by students whose names were called before the teacher even asked the question (09206), but a negative relationship for incorrect answers given by students called on as nonvolunteers (09207). Like other recent data (Anderson, Evertson, & Brophy, in press; Brophy & Evertson, 1976; Note 2; Anderson et al., Note 11; Good & Grouws, Note 12), these findings provide mixed support for certain group instruction methods that Kounin (1970) called "accountability" techniques.

The use of preselect nonpattern turns indicates that teachers occasionally called on students by name before even asking the question. Probably most of these preselections occurred because the students involved had not been volunteering to answer or had not been paying attention. Occasional direction of a question to such students is an accountability device: It reminds the students that they are held accountable for the lesson and might be called upon at any time to respond. If not used too frequently, and if not used punitively, this device can be useful. The range data from the present study suggest that the device was being used appropriately, and it did correlate positively with learning gains. However, the extremely low rate of occurence (about once every 15 class periods) and the lack of significant results for related variables (09010, 09201) indicate that this result, at best, is of dubious validity.

Calling on nonvolunteers who have not raised their hands seeking an opportunity to respond to a question directed at the class is another accountability device. However, it is less subtle than preselection, because the teacher is calling on a student who is not seeking to respond, and this in itself may be taken as an aggressive or punitive act. Further, the range data indicate that this method of calling on students was very frequently observed, and in fact was the most commonly used method in many classes. Consequently, the negative relationship with learning is unsurprising. Certain teachers apparently could not get many of their students to volunteer regularly, either because of poor teacher-student relationships or because of a poor match between difficulty level of questions and student readiness, so they apparently were forced to call on nonvolunteers in order to keep lessons moving. It is possible but unlikely that certain teachers called on nonvolunteers as a matter of policy; most teachers would recognize this as self-destructive.

In general, the data from the present study and those cited above suggest that the appropriateness of various methods of calling on students to respond varies with grade level and setting, and that within this, relationships between frequency of use of any particular method and learning outcomes are likely to be complex. In particular, small group instruction in the early grades seems to be facilitated when the teacher goes around the group in a predetermined pattern and suppresses call outs, whereas large group instruction in junior high school seems facilitated by a more rapid pace featuring direction of questions to the class as a whole followed by calling on volunteers.

In each setting, accountability devices such as occasionally directing a question to a student preselected before the question is asked or occasionally asking a student to comment upon or evaluate the previous statement of another student, may be necessary to enforce accountability or even useful as a change of pace. Overuse of these or other accountability devices indicates that something is wrong, however. If the teacher is resorting to these devices out of need, there probably is a poor match between the level of question and students' present knowledge and interest in the material, or a problem in the teacher's relationship with the class and ability to motivate them to respond. If the teacher overuses these devices deliberately as a matter of policy, it is likely that the teacher is overly authoritarian, is behaving vindictively, or is otherwise acting inappropriately.

The final effects observed in this section were two interactions

(09075, 09209). These results will not be interpreted because they represent infrequent events and because they do not contribute to a strong or consistent pattern.

Quality of student responses to questions. Student responses were classified into four categories (correct, incorrect, "don't know," and no response) (09019-22). Teachers generally asked questions at a difficulty level such that about three-fourths (77% = mean) of the students' answers were correct. Incorrect answers accounted for about 16% of all observed responses. Sometimes students said that they didn't know (3%) or failed to respond at all (4%).

In order to examine the quality of student responses in a variety of situations depending on the type of question and the method of selection, a large number of rate and proportion variables were generated (15005-08, 15009-22, 15050-57, 09005-08, 09014-22, 09050-58, 09125-39). Positive relationships with achievement for a number of rate variables were part of the general pattern favoring frequent public recitations. Only three of the 37 proportion variables showed significant main effects or interactions, so the results in this section must be interpreted with caution.

There were no significant relationships involving the general percentages of answers that were correct, but failure to make any response at all was negatively associated with learning (09022, 09056). Our previous work has established that failure to make any response at all correlates negatively with learning (Brophy & Evertson, 1976; note 2), and that the ability to elicit at least some kind of response from students when they do not respond to the initial question is an important part of effective teaching (Anderson et al., in press; Note 11). If anything, failure to respond is probably a greater problem in junior high school than in the early grades, because it is more unusual and more indicative of serious problems with the student or the teacher-student relationship. It indicates that students are afraid to risk making any response at all, or (more probably) that they have learned that the teacher will give the answer or move on to someone else if they wait quietly.

No significant relationships with achievement were found for proportions of correct, incorrect, or "don't know" answers. The only remaining significant result in this section (an interaction for 09052) will not be interpreted because of its isolated nature and low frequency of occurrence

Teacher reactions to student responses. A large number of variables concerned the ways that teachers reacted to student responses. In all, there were 60 rate variables and 120 proportion variables (15023-49, 15079-184, 15397-99, 09023-49, 09079-125, 09140-199. 09213-15, 09382-83). After a student had answered (or failed to answer) a question, the coding system allowed for the coding of a number of different reactions on the part of the teacher. Observers recorded whether the teacher praised or criticized the student's answer. Both praise and criticism were observed relatively infrequently; praise was observed after about 9% of all response opportunities (09382) and criticism after about 0.6% (09383). In addition, the teacher could continue the student's turn by giving some form of sustaining feedback (repeating the question, simplifying the question, or asking a new question). This happened an average of 12% of the time (09215). The teacher could also respond to the student's answer with a nonacademic question (3% - 09025, 09034). Most commonly, the student's turn was ended in some way (his answer was integrated into the class discussion, the teacher gave no response, the teacher simply acknowledged the answer, the teacher gave process feedback, the teacher gave the answer, the teacher asked another student, or another student called out the answer). This occurred about 85% of the time on the average.

Fourteen of the 60 rate variables showed positive main effects. All of these results are in line with the previously reported result that frequent public recitations are important for achievement. They will not be discussed separately here.

It is of interest that eight of the 14 positive relationships observed among the rate variables concern the use of praise (15023, 15079, 15080, 15141, 15142, 15143, 15144, 15395). These findings are the only ones that are supported by similar results among the proportion variables. The following proportion variables also showed positive associations with math achievement gains:

09023, Correct answers which teacher praised

09080, Answers to product questions which teacher praised

09142, Nonvolunteers whom teacher praised

09382, Response opportunities in which teacher praised

It is important to note that the findings reported here apply to praise only in the context of public discussion. These findings do not apply to other contexts, as will be seen. A more complete discussion of the findings on praise and criticism will be given following the presentation of results for English classes.

Only 10 of the 109 proportion variables not concerned with praise showed significant main effects or interactions. This is about the number that would be expected as a result of chance alone. Since the remaining results do not form a meaningful pattern, they will not be interpreted (09032, 09035, 09039, 09041, 09046, 09092, 09099, 09027, 09120, 09182). One interaction among the rate variables (15035) also will not be discussed.

A large number of the variables in this section concern the use of sustaining feedback, in which the teacher follows an inadequate answer with an attempt to elicit an improved answer from the same student. In general, the data for this study provide no support for the idea that teachers should try to elicit improved responses, and some evidence against it.

These findings contrast with more positive support for trying to improve responses seen in early elementary school data (Anderson et al., in press; Brophy & Evertson, 1976; Note 2). We believe that the differences in findings are related to the same kinds of differences in teacher-learning situations as were discussed earlier. That is, in the early grades it seems to be important for teachers to focus on each individual in asking questions and providing feedback, making sure to elicit responses and staying with the student long enough to ask follow-up questions or give follow-up explanations where necessary. The pace is slow, and sometimes what is ostensibly a group lesson becomes more a series of dyadic tutoring situations. In contrast, the public recitations involving the whole class at the junior high level are faster paced, and brief interactions with individuals are mostly geared to teaching the class as a whole. In this context, therefore, prolonging interactions with individual students in attempts to get them to improve their responses through repeated questioning is likely to be counter-productive. Many of these individuals will need individualized attention, but this will have to wait until the teacher can provide it without disrupting the learning focus of the rest of the class.

Taken together, the variables in this section illustrate the importance of keeping whole class recitation moving at a good pace at the junior high school level. This may be even more important than the need to provide immediate individualized attention when students fail to respond correctly, something that is more important at the early elementary grades.

2b. Student initiated questions and comments. The actions of students were coded in a number of different categories. Those recorded as "student initiated questions and comments" had the following characteristics:

1. They took place during public recitations. Questions and comments which were not monitored by the whole class (such as those during individual seatwork) were recorded as "student created contacts" with the teacher and will be discussed in section 3.

2. They were not responses to questions asked by the teacher. Public response opportunities are discussed in section 2a.

3. They were not merely attempts to socialize or to "get to" (bait) the teacher. These were recorded as misbehaviors and will be discussed in section 4.

For more detail on the characteristics and coding of student initiated questions and comments, see the Low Inference Coding Manual, Appendix C.

Student initiated questions and comments were fairly common occurrences; they were observed an average of about 5 times per class period (15200, 15201). About 74% of these were coded as questions and 26% as comments (09216, 09217). The observers also recorded whether the questions and comments were called out (an average of 60% of questions, 72% of comments, 09218, 09239), and whether they were relevant (95% of questions, 74% of comments) or irrelevant (5% of questions, 26% of comments). The teacher's reactions to student initiated questions and comments were also recorded in a number of categories to be discussed later.

The rate variables follow closely the already observed pattern of association between high student achievement gains and frequent public recitations. Significant positive associations with achievement gains were observed for virtually every rate variable that exhibited sufficient variance. The most important variables were numbers: 15413 "student initiated questions and comments", 15200 "student initiated questions and comments which were questions", and 15201 "student initiated questions and comments which were comments." Positive main effects for sixteen other variables (15202, 15203, 15207, 15208, 15214, 15218, 15219, 15220, 15222, 15224, 15229, 15230, 15231, 15400) fall into the same pattern. As with the data for response opportunities, this single pattern is so strong among the rate variables that it is necessary to rely on the proportion variables for a more detailed analysis of behavior patterns that are associated with effective teaching.

The rate variables are supported by a number of important proportion variables in a pattern which provides support for Flanders' (1970) stress on the use of student ideas as an effective teaching strategy. In addition to the rate variables discussed above, the following proportion variables showed positive associations with achievement:

09385, Dyadic contacts which were student initiated questions

09397, Student created public contacts

09235, Student initiated relevant questions which were redirected

09236, Student initiated relevant questions which were integrated into class discussion

09245, Student initiated relevant comments called out and given feedback

09247, Student initiated relevant comments called out and integrated into class discussion

Thus, it appears that the more effective teachers tend to have high rates of student initiated questions and comments, that student initiated questions and comments are a relatively high proportion of their contacts with students, and that they react to relevant questions and comments in ways that imply recognition of the value of the student's contribution.

Student initiated questions and comments were sometimes a mixed blessing. When they were called out and/or irrelevant, they could detract from the continuity of the class and make it difficult for the teacher to maintain a continued emphasis on academic matters. A large set of interactions indicates that the more effective teachers reacted differently in high and low ability classes. All of the following variables had opposite slopes for the regression lines for high and low ability classes, generally slightly positive for low ability classes and slightly or significantly negative for high ability classes:

09226, 15210, Student initiated called out questions which were irrelevant

09227, Student initiated irrelevant questions called out and ignored

09229, 15213, Student initiated irrelevant questions called out and given feedback

09239, Student initiated comments which were called out

09248, 15232, Student initiated irrelevant comments which were called out

09250, Student initiated irrelevant comments called out and ignored

15235, Student initiated irrelevant comments called out and not accepted

09252, 15236, Student initiated irrelevant comments called out and given feedback

The remaining significant results in this section (09221, 09233, 09254, 15225, all interactions) seem to fall into this same general pattern.

Although a number of the interactions presented above are weak and based on low-frequency data, the pattern is probably an important one. It is in part a replication of our own results at the second and third grade level (Brophy & Evertson, 1976; Note 2). It is also one of the few patterns of results that is partly replicated by the results for English classes in this study. It is apparently especially important for teachers in high ability classes to maintain a narrow academic focus, even at the expense of discouraging student initiative. In the low ability classes, on the other hand, the more successful teachers were those who allowed students to express their ideas, even if they were not directly relevant to the academic task at hand. (However, the observed ranges do not suggest that the effective teachers let this get out of hand.)

3. Private contacts between teachers and students. In addition to recording public interactions between teachers and students, observers coded private contacts such as those that took place during seatwork. Contacts were grouped into two broad categories: student created contacts and teacher afforded contacts. Within each category the following information was coded:

1. The content discussed during the contact (academic, procedural, or personal request).

2. The length of the contact (brief or long).

3. The teacher's use of praise or criticism.

4. If the observer could hear, he or she recorded the type of feedback

given by the teacher (simply observing the student's work, delaying a request, giving simple feedback, giving process feedback).

Private contacts between the students and the teacher were fairly frequent occurrences in most of the classrooms observed (as would be expected in view of the large amount of seatwork observed). On the average, observers saw student-created academic contacts about 11 times a period (15247), student created procedural contacts about four times a period (15248) teacher initiated academic contacts about three times a period (15264), teacher initiated procedural contacts about two times a period (15276). Thus, private contacts between the teacher and student were more common than public ones in most of the observed classes (15393, 15411, 15412).

It has already been noted that the more successful teachers tended to ask more public questions, respond to more public student questions and comments, spend more time in lecture demonstration, and spend less time in seatwork than the less successful teachers. In view of these facts, it is perhaps surprising that the more successful teachers did not have significantly fewer private contacts with their students. No significant relationships were observed between any of the rate variables recording private contacts and student achievement gains in math (15247, 15248, 15264, 15276, 15411, 15412). Since the more effective teachers had more contacts with their students overall; however, their private contacts with students were proportionally fewer (09387, 09391).

A significant pattern of effects was observed; however, with regard to the length of private contacts between teachers and students. The more successful teachers tended to keep their contacts brief. Positive relationships with achievement were observed for the following variables, all involving brief feedback:

09271, Student created academic contacts involving brief teacher contact

09274, Student created academic contacts given simple feedback

09280, Student created academic contacts given brief feedback

09281, Student created academic contacts given brief process feedback

09293, Teacher initiated academic contacts which involved brief process feedback

Negative relationships with student achievement gains were observed for the following variables, all involving long feedback:

09272, 15252, Student created academic contacts involving long teacher feedback

09283, 15263, Student created academic contacts involving long process feedback

09275, Student created academic contacts involving process feedback

09288, Teacher initiated academic contacts which were long

09295, Teacher initiated academic contacts which involved long process feedback

Two other variables (09291, 15261) showed interactions which seemed to fall into the same pattern.

Although it was apparently important for the teacher to keep private academic contacts with students brief, it didn't seem to matter much *what* was said. Except for those variables noted above, no significant relationships were observed between achievement gains and a particular type of feedback during academic contacts. It is of interest that though many positive relationships with achievement were observed for public praise, private praise seemed to be much less effective. In general, there seemed to be no association between teacher praise or criticism during private contacts and student achievement gains (09393, 09394).

The main pattern observed in this section is similar to one observed earlier for public response opportunities. The more effective teachers seemed to be doing a good job of balancing the needs of the individual with the pressure to teach the class as a whole. They kept the class moving at a good pace by keeping private work-related interactions with students brief, providing enough feedback and guidance to get them going again, but not stopping for lengthy interactions that would keep them from meeting the needs of other students. These data also support the ideas of Good and Grouws (Note 12) that the more effective teachers make sure that their students understand how to do their work before they assign seatwork. Thus, they planned their classes so that their students had less need for long private explanations after they had begun doing seatwork.

Five interactions involved personal requests from students. Neither the number of personal requests or the teacher's handling of them was significantly related to achievement for low ability classes. In high ability classes, on the other hand, there was a strong negative relationship between the number of personal requests and student achievement (09276, 15256). Teachers who granted large numbers of personal requests tended to be ineffective with high ability students (09277, 15247), whereas the more effective teachers tended to refuse a larger proportion of their students' personal requests (09279). Once again, these results fall into the pattern of favoring a narrow emphasis on academic matters for high ability classes.

The final two significant results in this section, both interactions, also seem to be connected with the same pattern. In low ability classes the more effective teachers tended to initiate more procedural contacts with their students (09296) and fewer academic contacts (09284). This pattern is much weaker and less reliable than the others discussed in this section.

4. Behavior related contacts between teachers and students. Observers coded misbehaviors on the part of students' and teachers' reactions to them. Misbehaviors were coded in 11 categories, most of which fit into two major classes. Those misbehaviors which were classed as mild (daydreaming, wasting time, working on the wrong assignment, socializing) were coded only when they provoked a reaction from the teacher. Serious misbehaviors (disrupting the class, sassing or defying the teacher, verbal aggression, physical aggression, baiting the teacher) were coded whenever they were observed, whether the teacher reacted to them or not. Several types of misbehaviors were coded but not put into either large class (being late to class, leaving without permission, sleeping, possession of contraband). Categories also existed for misbehaviors which the observer did not see, but which provoked a teacher reaction, and for "other" misbehaviors which did not fit into any of the above categories.

Behavioral contacts were not uncommon in the observed classes. They were observed an average of about five times a period (15394). The range for variable 15394 is also of interest. Some teachers hardly ever had to speak to their students about their behavior, while others averaged as much as 16 times per period. Most of the observed behavioral contacts concerned mild misbehaviors (15407), but there were classes in which serious misbehaviors occurred several times a period (15408).

Surprisingly, there were no significant relationships between rates of misbehaviors and achievement gains in math (with the exception of one interaction, probably spurious, on variable 15280). This result is surprising since negative correlations between rates of behavioral contacts and achievement have been a consistent finding of other process-product studies (Brophy & Evertson, 1976; Note 2; Good & Grouws, Note 12). Rates of serious misbehaviors were also negatively correlated with achievement in English for the present study. It certainly appears that the rates of misbehaviors were also negatively correlated with achievement in English for the present study. It certainly appears that the rates of misbehaviors in some classes should have been high enough to seriously disrupt learning.

Teachers' reactions to misbehaviors were coded in four categories. Two of these categories involved relatively mild responses. The teacher could intervene nonverbally (observed about 3% of the time on the average, 09312) or they could respond to the misbehavior with a management request (observed about 69% of the time, 09313-16). Two other possible responses were more severe. These were threats or warnings, (5%, 09321-23), and criticism (16%, 09317-20). The latter category includes punishment.

A number of results indicate that the more effective teachers tended to react to misbehaviors with mild responses, especially management requests. The following variables showed positive associations with student achievement gains in math:

09313, Misbehaviors which involved management requests from teacher

09332, Socializing misbehaviors involving a management request

09347, Student physical aggression handled by a management request

09359, Misbehaviors which involved management requests

09366, Mild misbehaviors involving management requests

The following variables, all of which involve severe reactions to misbehaviors, were negatively related to student achievement gains in math:

15404, Behavioral criticism

15297, Misbehaviors in which teacher criticized (no error)

09348, 15328, Student physical aggression which teacher criticized

The pattern of results presented above is not a strong one. There were many important variables for which there were no significant results or results that did not fit the pattern.

It seems likely that the situation is actually a complicated one. It may be, for instance, that the results presented above represent an effect rather than a cause. The more effective teachers may use milder reactions to misbehavior because they have better control over their classes in the first place, and therefore have less need for severe reactions.

This interpretation is supported by a number of interactions. Misbehaviors were more common in low ability classes (as revealed by analysis of variance on variable 09389). A number of interactions seem to indicate that effective teachers were also more likely to react severely to misbehaviors in low ability classes. The following variables were positively associated with achievement gains in low ability classes and negatively associated with achievement in high ability classes:

09321, Misbehaviors in which teacher threatened student (no error)

15316, Misbehaviors involving tardiness which teacher criticized

15338, Misbehaviors not in above categories which teacher criticized

09361, Misbehaviors in which teacher threatened student

For the following variables which involve mild teacher reactions, the interactions go the other way (positive for high ability, negative for low):

09342, Defiance of teacher responded to with a management request

09345, Student verbal aggression handled with a management request

09354, Student baits teacher and teacher handles with a management request

Thus, it appears that mild responses to misbehaviors may be most appropriate with high ability students, who are less likely to present severe behavior problems. This pattern of results, though it is partially replicated by findings for English classes, is again a weak one, based on low frequency data, and missing many important variables.

The remaining results in this section concern errors in teachers' responses to misbehaviors. When a teacher directed his attention to the wrong student, the observer coded a target error. Not surprisingly, target errors were generally negatively correlated with achievement gains (15294, 09314, 09363, 09375). When the observer felt that the teacher had waited too long before responding to a misbehavior, he or she coded a timing error. The only two significant results for timing errors are interactions, and they will not be interpreted because the data are of doubtful validity (09315, 09322).

5. Social interactions between students and teachers. Of all the major categories between students and teachers, social interactions were the least commonly observed--an average of slightly more than once a period (15402). Social contacts were not significantly associated with student achievement in math classes.

6. Summary and discussion. Effective instruction in junior high math classes was marked by an academic orientation, relatively more whole

group instruction and less individualized contact, frequent public recitation and discussion with active student involvement and initiation of questions and comments, maintenance of a rapid pace, calling mostly on volunteers and minimizing lengthy interruptions to deal with the needs of individual students on the spot, and in general, a stress on eliciting and reinforcing high quality responses to questions designed to move the class along at a good pace. All of this was especially true with respect to high ability students.

Both the level of demand and the level of discourse was lower in the low ability classes (appropriately so) and effective teachers in these settings spent more time dealing with individuals, especially attempting to elicit improved responses. The effective teachers in low ability classes were also more tolerant of distractions from academic tasks such as irrelevant comments and personal requests, but not of misbehaviors. There was much support for aspects of what Flanders (1970) has called indirect teaching, particularly praise (at least in public interactions) and use of student ideas. Again, however, this assumes a context of a strong academic and demanding orientation.

English

The data representing the relationships between classroom behaviors and student achievement gains for English are much less satisfactory than those for math. Possible reasons for this will be discussed at the end of the chapter. At this point, it is worth noting the following contrasts between the math data and the English data:

1. Entering CAT scores accounted for an extremely high proportion

of the variance in the English achievement tests--85%, compared with 71% for math.

2. The variables that showed significant main effects or interactions for math tended to be those which represented commonly occurring classroom events and showed considerable variance. In contrast, many of the statistically significant relationships for English occurred for variables which represented rare classroom events, while there was no relationship with achievement for more important variables.

3. There were more statistically significant interactions than main effects.

4. In contrast to math, there often seemed to be no pattern to the findings. An interpretation suggested by one variable would not be supported or would even be contradicted by the results for related variables.

In view of the inconsistent nature of the English findings, little attempt will be made to interpret many of the results. Variables that showed significant main effects or interactions will be listed for those who wish to attempt their own interpretations. Tables with complete results for each variable are in Volume II, pages 288-401 (proportion variables) and 402-481 (rate variables).

1. Teachers' use of time in the classroom. As in math, most of the observed English classes spent most of their time in individual seatwork, discussion, or lecture-demonstration. There did seem to be slightly more variation in the formats used by the English teachers, with some classes spending appreciable amounts of time in formats such as special activities, advance organizers, and other (unspecified) activities (15362-15381).

Only two significant effects occurred for these 20 variables (15378 "minutes in testing"; 15381 "number of peer tutoring situations"). These will not be interpreted because they exhibit insufficient variance and they are of questionable validity. (Observers did not code during classes when hour tests were given.)

2a. Public academic response opportunities. The strong pattern that was observed in the math data favoring the use of frequent class discussions with high rates of student participation was not observed for English. Neither was any other pattern. The discussion of public response opportunities will therefore be limited mainly to descriptive data.

Public response opportunities were observed about as frequently in English classes (an average of about 12 per period) as in math classes (an average of about 13 per period).

As in math classes, teachers tended to ask mostly product questions (an average of 78% of all questions). Most of the remaining questions were process questions (14%). A few were choice questions (3%) or opinion questions (5%). One significant main effect (15003) and one significant interaction (15001) were obtained for relationships with student achievement gains. Neither will be interpreted.

The observed ranges for variables 09009-13 indicate that there was a great deal of variation in the ways that teachers chose the students to respond to their questions. The most commonly observed method of selecting students was calling on nonvolunteers (an average of 42% of the time), followed by calling on volunteers (25%), call outs (21%), patterned turns (8%), and preselecting students in nonpatterned turns (4%).

There are a number of interactions between classroom behavior proportions and entering CAT scores in their relationship with achievement (09012, 09013, 09063, 09073, 09076), but no main effects. This suggests that appropriate methods of selection may be different for high and low ability students, but the data do not show any pattern strong enough to allow confident interpretation.

The practical significance of these interactions is doubtful for two reasons. For some variables (09012, 09013) the per unit change from low to high levels of the variables is quite small (the regression lines have shallow slopes). Other variables (09063, 09073) represent infrequent events. This is true even for some proportion variables where there appears to be an adequate range. Variable 09073, for instance, represents "choice questions directed to volunteers." Since the average teacher asked only about one choice question every three periods (15003), the practical utility of this variable is highly questionable.

Variable 09076 (Product questions answered by a student calling out) does represent a fairly frequent event, and there is a significant relationship with achievement for low ability classes. This variable seems to be part of a very weak pattern of interactions which includes variables 09013 (Response opportunities which students answered by calling out) for English and two variables (90975, 09209) among the math results. These four variables showed similar trends: positive for high ability classes, negative for low. More than a dozen related variables showed no such trends. If these results are of interest at all, it is because they contrast with the much stronger patterns concerning student initiated questions and comments which were called out.

In English, as in math, students answered most questions correctly. On the average, about 82% of the observed student responses in English classes were correct, 12% were incorrect, 3% were "don't know" and students failed to respond about 3% of the time.

The relationships between quality of student responses and achievement do not fall into an interpretable pattern. Main effects were observed for variables 15007, 15053, 09055, and 09132. Interactions were found for variables 15005, 15003, 15050, 09053, 09127, 09135, 09204, and 09211. Most of these variables represent very infrequent events, while variables representing events which occurred much more commonly showed no significant effects. Once again, the predominance of interactions over main effects is notable, suggesting that high and low ability students may have different needs in English classes.

The data for teacher reactions to student responses show a similar pattern of occurrence to that already observed for math. Most teachers used praise and criticism sparingly--praise occurred on an average after about 11% of all response opportunities and criticism after about 0.4%. Most students' turns were ended after their answers, either by simple acknowledgement from the teacher, or by some form of terminal feedback (an average of about 87% of the time). Teachers sometimes gave students sustaining feedback (10%--09215) or followed a student response with a nonacademic question (3%--09025, 09034).

With the exception of the data on praise, the large number of feedback variables (180 variables in all) yielded no interesting patterns of results. Main effects were observed for eight of the variables not concerned with praise (15029, 15121, 15122, 09088, 09114, 09125, 09192). Interactions were observed for 18 other variables (15027, 15091, 15107, 15115, 15119, 15184, 09028, 09030, 09036, 09039, 09107, 09112, 09113, 09159, 09168, 09184, 09185, 09189). The predominance of meaningless results and of interactions are again notable.

Praise and criticism. The findings concerning the efficacy of public praise which were observed for math classes were repeated for English classes. Positive main effects were observed for the following variables:

15081, Answers to choice questions which teacher praised
15143, Volunteers whom teacher praised
09023, Correct answers which teacher praised
09144, Call-out students whom teacher praised
09382, Response opportunities in which teacher praised

In addition, an interaction was observed for variable 09082, "answers to opinion questions which teacher praised." The variable was positively related to student achievement gains for high ability classes and showed little relationship for low ability classes. It is noteworthy that among these results main effects predominate, and that several of the variables represent frequent occurrences in the classroom.

The findings for praise and criticism in junior high school math and English classes can be summarized by looking at variables 09382, 09383, 09393, and 09394, as shown below:

Variable	Relationship with Achievement	
	Math	English
09382, Response opportunities in which teacher praised	+	+
09383, Response opportunities in which teacher criticized	ns	ns
09393, Private academic contacts which teacher praised	ns	ns
09394, Private academic contacts which teacher criticized	ns	ns

Thus, there is a clear pattern, with many other variables supporting these, showing that the more successful teachers tended to praise more during public discussions, but that use of criticism or private praise did not correlate with increased student learning. It is possible, of course, that this pattern represents an effect rather than a cause. It may be that the more successful teachers were simply better at eliciting praiseworthy answers from their students.

In general, these data support our own previous findings (Anderson et al., in press; Brophy & Evertson, 1976; Brophy & Evertson, Note 2) indicating that the appropriateness and effectiveness of praise and criticism vary with context.

However, the findings for praise in junior high math and English classes contrast with those seen in the early elementary grades. In elementary school, praise during public response opportunities usually shows weak and insignificant relationships to learning gains. The important relationships concern praise given during private teacher-student interactions. Praise given during student initiated interactions correlated negatively with learning gains, while praise given in teacher initiated interactions often correlated positively (Brophy & Evertson, 1976; Note 2). Apparently, this was due to differences in the genuineness and specificity of praise [illegible]se two situations.

In early grades, it is very common for students to bring their work up to show to the teacher when they are finished. Many such students are very dependent upon the teacher or eager to please the teacher, and they will show their work in a way that amounts to "asking for" praise. Teachers usually provide it, but much such "praise" is perfunctory, usually a brief word or two without elaboration of specifics and sometimes without even close inspection of the work. Considering the nature of the praise and the situations which elicit it, it is not surprising that praise under these circumstances correlates negatively with learning gains. In contrast, praise given during teacher initiated work related interactions usually is initiated by the teachers themselves, and it tends to be more genuine, as well as more elaborated. It is not a frequent or strong correlate of learning gains, but when it does correlate, it correlates positively.

The dynamics of teacher-student relationships change considerably across grades, though, and by junior high school few students actively seek teacher praise, especially for everyday work. When students do initiate private work interactions with teachers, they seek help with problems or confirmation that they have completed their assignment and can move on to something else. They rarely "ask for" praise the way that early elementary students do. Nor do teachers praise frequently in these situations. As a result, teacher praise given during student initiated private interactions drops out as a significant correlate of learning gains.

Also, the switch from an individual to a group focus changes the dynamics of public and private interactions initiated by the teacher. In the early grades, public recitation concentrates on practice of basic skills. The tasks required of each individual student are similar, and students are not yet developed to the point where they are likely to make truly impressive contributions at their own initiation, or to recognize such contributions when made by others. Consequently, teacher praise during public recitation situations tends to be brief and perfunctory even when sincere. Most early elementary teachers praise frequently, and even predictably, in these situations, further watering down the impact of any particular praise statement on the target student or the rest of the class. As a result, praise during public recitation situations usually does not correlate strongly with learning gains one way or the other in the early grades.

The situation is different in junior high schools, however. Teachers praise much less routinely, usually because they are aware on some level of consciousness that students do not appreciate public praise for routine accomplishments. It may be taken as condescending, or it may produce embarrassment to the student. However, junior high students are capable of genuinely outstanding contributions or accomplishments, and of recognizing these when they are made by classmates. So are the teachers, of course, and when such contributions or accomplishments appear, they will tend to elicit genuine admiration and praise from the teacher. Much of the public praise occurring in junior high school has this connotation, so it is not surprising that it correlates positively with learning gains.

The positive relationship between praise given during teacher initiated work interactions and student learning in the early grades has reversed by junior high school. Again, the dynamics of these interactions have changed. In the early grades, these teacher initiated work related interactions are very frequent. They occur more often and extend longer with students who are having trouble with their work, but they do occur with all students regularly. By junior high school, these interactions tend to be focused on students who are having trouble with their work. Therefore, the quality of praise is different from that observed in public recitations. Usually, it involves not so much genuine teacher admiration for student accomplishments as attempts by the teacher to be encouraging with students who are having problems. Under the circumstances, such praise is not truly reinforcing.

The findings for criticism in public and private situations are similar across grade levels. At all levels, public criticism for failure to respond to a question or answering it incorrectly is rare, and when it is given, it tends to be "deserved." Under the circumstances, it is not inappropriate criticism, and occasionally it even correlates positively with learning gains. Criticism given during private work related interactions is more frequent and usually indicates that the students involved are consistently failing to apply themselves to their work, that the teachers are having trouble findings ways to motivate or instruct them successfully, and/or that the teacher in hypercritical. Not surprisingly, criticism in this context correlates negatively with learning gains (09286).

2b. Student initiated questions and comments. As in math classes, student initiated questions and comments were observed an average of about five times per class period (15200, 15201). Comments were relatively more common in English classes than in math classes. On the average, about 37% of observed questions and comments were comments and 63% were questions (09216, 09217). The most common way for students to ask their questions or make their comments was by calling out (an average of 67% of the time, 09218).

The pattern of interactions that was observed for math classes is repeated for English classes. High rates of call outs tend to be negatively associated with achievement gains for high ability classes, but positively associated for low ability classes. This pattern appears for three major variables, as follows:

15223, Student initiated comments which were called out

09219, Student initiated called out questions which were relevant

09240, Student initiated relevant comments which were called out

The pattern is also seen in a number of less important variables (09242, 09244, 09245, 15224, 15226, 15229). Several curvilinear relationships also show the same general pattern (see Volume II, Table 18, variables 09217, 09219, 09223, 09239, 09240. Note that the right-hand portions of the curves are based on extrapolated scores). It is notable that the slopes of the regression lines for these variables are the opposite of those seen in the much weaker pattern concerning called out answers to response opportunities.

It is apparent that call outs mean different things in high and low ability classes. A teacher who allows large numbers of call outs in a high ability class is probably doing a poor job of controlling the competitiveness of the students. In a low ability class on the other hand, relevant call outs may well be an indication of student interest. These variables also form part of the more general pattern which is seen in several other sets of variables. Successful teachers of high ability classes maintained a more businesslike, academic atmosphere, while successful teachers of low ability classes were more likely to show a personal interest in their students and to encourage student expressiveness, even if the student was not exactly on task.

One main effect (09255) and seven other interactions (15219, 15220, 15222, 15243, 09238, 09260, 09297) were observed for the data in this section. For all of these variables, the data are technically deficient, and they do not form a coherent pattern. The results, therefore, will not be interpreted. Once again, the preponderance of interactions over main effects is notable.

3. Private interactions between students and teachers. In English, as in math, private academic contacts between teachers and students were more common than public response opportunities. Observers recorded an average of about 15 student created contacts and six teacher initiated contacts a period in English classes (15411, 15412).

In math, the more successful teachers were those who generally kept private contacts with students relatively short. This pattern was not repeated for English classes In general, there was no relationship between variables concerning the length of interactions and student achievement gains.

There was, however, a set of interactions, mostly weak and involving shallow slopes for the regression lines, indicating that a narrow focus on academic matters is more important for high-ability classes than for low ability classes, and that in the high ability classes, successful teachers were more likely to initiate contacts, and students less likely. All of the following variables showed significant interactions with slight positive relationships with achievement for high ability classes and slight negative relationships for low ability classes:

09284, 15264, Teacher initiated contacts which were academic related
09267, Student created contacts related to academic content
09388, Dyadic contacts which were teacher initiated (private)
09395, Private academic contacts

An interaction in the opposite direction on variable 09396,"private non-academic contacts," falls into the same general pattern. Also part of the same pattern are interactions on six less important variables (15265, 15268, 15271, 15275, 09278, 09285).

Although the pattern presented above is a real one, it is not strong. The slopes of most of the regresssion lines are too shallow to reach our own criteria for reporting and interpretation. The results thus indicate that a slight difference in emphasis might be appropriate for high and low ability classes, but they do not support the use of radically different teaching methods.

Only two other significant results occurred for the variables in this section. A positive main effect was obtained for variable 15274, "teacher initiated academic contacts which involved long feedback." This result will not be interpreted because of its isolated nature and the infrequent occurrence of the event. In addition, there was a negative relationship with achievement for variable 09286, "teacher initiated academic contacts which involved criticism." This result has been discussed in the section on praise and criticism above.

4. Behavior related contacts. In English classes, as in math classes, behavioral contacts were observed an average of about five times a period (15394), and most of the observed behavioral contacts involved mild misbehaviors (15407, 15408). The range is again notable. Some of the observed teachers had obviously lost control of their classes. It is also notable that an average of about one contact in nine was behavior related, but for some teachers, this ratio climbed to as high as one contact in three (09389).

Not surprisingly, teachers who spent much of their time dealing with behavior problems, especially serious misbehavior, were not particularly effective in teaching English. The following variables showed negative relationships with student achievement gains:

09389, Dyadic contacts which were behavior related
09305, 15285, Students leaving the class without permission
09307, 15287, Misbehaviors involving students baiting teacher
15282, Misbehaviors during which student sassed or defied teacher
15293, Misbehaviors involving management request from teacher
15322, Defiance of teacher responded to with a management request
15334, Student baits teacher and teacher handled with a managment request
15388, Serious misbehavior which teacher handled without error
15408, Serious misbehaviors

The composite picture which emerges from these results is one of a teacher who "lets the students walk all over him or her." There was no relationship between achievement and rates of milder misbehaviors (15407). The misbehaviors listed above are serious and public in nature. They demand a response from the teacher. Some less successful teachers apparently often responded to these serious misbehaviors with mild words (management requests). Although the rates of occurrence for many of these misbehaviors are relatively low, the misbehaviors are serious enough to be significant whenever they happen. It doesn't take very many instances of student defiance to seriously affect the atmosphere of a classroom.

It seems to be especially important that the teachers "keep the lid on" in low ability classes. A number of interactions indicated that the more successful teachers in low ability classes tended to react to misbehaviors more severely than successful teachers of high ability classes. For all of the following variables, which involve severe reactions to misbehaviors, there were positive associations with achievement gains for low ability classes and negative associations for high ability classes:

09321, Misbehaviors in which teacher threatened student
09323, Misbehaviors in which teacher overreacted with a threat
09330, Mild misbehaviors where teacher threatened student
09334, Socializing misbehaviors where teacher threatened student
09361, Misbehaviors in which teacher threatened student
09367, Mild misbehaviors involving teacher criticism

The regression lines slope the opposite way (positive for high ability classes, negative for low ability classes) for the following variables, involving mild reactions to misbehaviors:

09331, 15311, Socializing misbehaviors in which teacher intervened nonverbally

09338, Disruptive misbehaviors in which teacher intervened nonverbally

15292, Misbehaviors in which teacher intervened nonverbally

15307, Mild misbehaviors in which teacher intervened nonverbally

For a single variable (15324,"defiance of teacher responded to with teacher threatening student"), the interaction goes in an unexpected direction (positive for high, negative for low). It could be argued, however, that a threat such as "I'll send you to the office if you don't stop that," may be a fairly mild response to student defiance.

Once again, we are reporting here a series of weak interactions, many of which have very shallow slopes for the regression lines. They indicate, if anything, a slight difference in emphasis between successful teachers in high and low ability classes. Most of the variables above also involved teacher reactions which were rarely observed. The most common forms of reaction to student misbehavior were management requests and criticism. The pattern of results reported here is therefore based on technically deficient data.

Of the remaining significant results from this set of variables (09306, 09314, 09363, 09371, 09376), most concern positive relationships with achievement for target or timing errors in teacher reactions to misbehavior. There seems to be no reason why this should be so. The data are technically deficient, and of questionable validity. The coding of a target error or a timing error depended considerably more on the judgment of the observers than most other categories in the observation system. It may be that observers were inconsistent in their use of this code.

5. Social interactions between teachers and students. Teachers rarely initiated social contacts with students, and there were no significant

associations between teacher-initiated social interactions and student achievement gains (15339, 09378).

Student created social contacts were somewhat more common, being observed an average of about once a period in English classes (15340). There were significant interactions for six of the eight variables concerned with student created social contacts. Although the regression lines had shallow slopes for these variables, all of the interactions were statistically highly significant ($\underline{p} \leq .02$ for all six variables). The following variables were negatively associated with achievement gains in high ability classes and positively associated with achievement gains in low ability classes:

15340, Student created contacts which were social

09380, 15341, Student created social contacts which were accepted

15402, Social contacts

09390, Dyadic contacts which were social

In addition, variable 09381, "student created social contacts which teacher did not accept," was positively related to achievement for high ability classes and negatively related for low ability classes.

The pattern here fits with that observed in other variables. The more successful teachers in high ability classes maintained a tight academic focus, while in the low ability classes the more successful teachers are more likely to show a personal interest in their students and be more accepting of the students' social overtures.

6. Summary and discussion. In general, the patterns of relationships linking process variables to learning were much less clear for English classes than for math. Main effects in particular were very rare. Most of the

interpretable main effects fell into one of two patterns. First, teachers who tolerated higher rates of serious misbehaviors were less likely to be successful in inducing student achievement gains. Second, the pattern of results favoring higher rates of public praise which was observed for math classes was again observed for English classes.

Interactions were much more common than main effects, but many were impossible to interpret. Interactions which were based on technically suspect data and interactions which did not form interpretable patterns were common. The observed patterns of interactions included the following. Successful teachers in low ability classes were more likely to:

1. Accept or tolerate student call outs of questions and comments.
2. Have private contacts with their students about nonacademic matters and let students initiate private contacts.
3. React more severely to students' misbehaviors.
4. Accept students' attempts to discuss social matters with them.

Overall, the picture is one of a very businesslike, academic orientation in the successful high ability teachers, and a more personal orientation with more emphasis on student expressiveness for the successful low ability teachers.

The nature of the sample may also explain in part the high incidence of interactions rather than main effects. The low ability classes generally contained higher numbers of Chicanos, for many of whom English was a second language, and low-income Blacks, who often spoke a dialect form of English. It is hardly surprising that teachers in these classes found it necessary to use different tactics from teachers of high ability classes, where most of the students had grown up speaking the same form of English as the teachers were trying to teach.

The pattern of interactions described above bears a striking similarity to the description by Metz (1978) of the adjustments that teachers make to the demands of the students in their classrooms. Metz tends to view the adjustments that teachers make for low ability students as "necessary evils" which may not ultimately be in the best interest of the students themselves:

> In practice, if not in intent, the teacher engages in exchange with the lower level classes. The teacher permits inattention to the academic task and minor breaches of classroom etiquette in exchange for the students' willingness to refrain from really disruptive noisy activity or overt angry attack upon the teacher.
>
> Such an exchange may allow everyone to get through the hour without unduly intruding upon one another. But it does not result in the most academic progress for the majority of the students. Some teachers tried to alter the pattern, either through better sources of coercive control or, more frequently, through increasing students' intrinsic interest in the academic task. . . . And, in fact, there was evidence that over a long time teachers gradually come to adopt an educational philosophy which justifies the strategies that yield the minimum of conflict with students of the schools they find themselves in. (pp. 109-110)

The data from this study, however, seem to indicate that the teachers who conformed to the expectations of their students and accepted some de-emphasis of academics with low ability classes were more successful in inducing achievement test gains than those who did not.

In addition to the predominance of interactions over main effects, however, the English data are also notable for the relative paucity of consistent patterns of relationships. We believe that there are several reasons for the lack of consistent relationships between the measures taken from our low-inference coding system and our measures of student learning in the English classes. First, there is less uniformity of curriculum and instruction at the junior high level than in the early grades, and a smaller percentage of the curricular objectives held in common could be included on our test. It appears that this model of process-outcome research, featuring year-long data collection and using adjusted scores on an end-of-year achievement test as the criterion, is not appropriate for junior high English classes, at least not without much more extensive end-of-year testing.

The model worked reasonably well even in junior high school for studying math, apparently because there still is a strong emphasis on skill practice and a relative homogeneity of curriculum and instruction across classes and schools within the same grade for math. For English, though, there is much more variation, meaning that the content validity of the English achievement test was watered down considerably. Test items were valid in the sense that they were objective-referenced, using information obtained from interviews with teachers and from our own classroom observations concerning what objectives were being taught in these classes, but there were not enough items.

The validity of the test can also be questioned on the basis of a significant ($p = .0001$) tendency for high ability classes to show lower residual gain scores. It appears that the assumed linear relationship between CAT scores and posttest scores does not hold for students performing well over grade level.

There would be problems in trying to cover uncontrolled naturalistic variation across many classes and schools with a single 45-minute test in any case, but these problems were exaggerated by the nature of the sample in the present study. We included almost all of the eligible math and English classes in nine of the 11 junior high schools in the city. These included two inner-city and primarily minority schools, as well as three others serving unusually homogeneous upper middle class populations. Despite a degree of busing for desegregation purposes, there were strong school effects in the distributions of student ability and achievement test scores. The scores themselves extended along a great range, distributed more horizontally than normally. As a result, the use of the students' California Achievement Test scores as co-variables for adjusting their scores on our achievement test had the effect of removing even more criterion variance than is usual in these situations. This was especially true for English classes, where some 85% of the variance was accounted for by CAT scores (compared to about 79% for math). With so much variance in English achievement already accounted for by the covariable, it is likely that most of the remaining variance was unreliable, thus further decreasing our chances of finding a rich pattern of relationships.

Finally, it is possible that the validity of the achievement test was reduced by the nature of the task facing the teachers. Math teachers are, for the most part, teaching skills to their students that they practice very little outside of math class. Most students practice speaking English, however, all day long, and they read and write English in their other classes, if not at home. It is hard for a single teacher to have a measureable effect on a skill that is so deeply ingrained and so habitual in nature, and it is virtually impossible to separate the effects of the English teacher from the effects of the many other models who help to determine how a student uses the English language. The emphasis on grammar in the achievement test may have helped slightly with this problem but at the the same time it increased the doubts about the content validity of the test.

TABLE 3.1

LOW-INFERENCE RATE VARIABLES

```
RESPONSE OPPORTUNITIES GENERATED BY PROCESS QUESTIONS

                          MEAN      SIGMA         RANGE          N
ID = 15001    MATH        2.27      2.76      0.00 - 12.84      56
              ENGLISH     1.47      1.37       .05 -  6.96      78

RESPONSE OPPORTUNITIES GENERATED BY PRODUCT QUESTIONS

                          MEAN      SIGMA         RANGE          N
ID = 15002    MATH        9.03      5.54       .03 - 21.07      56
              ENGLISH     9.59      6.44       .51 - 32.86      78

RESPONSE OPPORTUNITIES GENERATED BY CHOICE QUESTIONS

                          MEAN      SIGMA         RANGE          N
ID = 15003    MATH         .33       .53      0.00 -  2.08      56
              ENGLISH      .31       .42      0.00 -  1.85      78

RESPONSE OPPORTUNITIES GENERATED BY OPINION QUESTIONS

                          MEAN      SIGMA         RANGE          N
ID = 15004    MATH         .08       .21      0.00 -  1.30      56
              ENGLISH      .55       .70      0.00 -  3.98      78

PROCESS QUESTIONS WHICH STUDENTS ANSWERED CORRECTLY

                          MEAN      SIGMA         RANGE          N
ID = 15005    MATH        1.73      2.26      0.00 - 10.65      56
              ENGLISH     1.21      1.15      0.00 -  5.48      78

PRODUCT QUESTIONS WHICH STUDENT ANSWERED CORRECTLY

                          MEAN      SIGMA         RANGE          N
ID = 15006    MATH        7.87      4.49       .29 - 17.70      56
              ENGLISH     7.76      5.14       .42 - 23.36      78

CHOICE QUESTIONS WHICH STUDENTS ANSWERED CORRECTLY

                          MEAN      SIGMA         RANGE          N
ID = 15007    MATH         .27       .43      0.00 -  1.74      56
              ENGLISH      .25       .35      0.00 -  1.52      78
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Table 3.1 (cont.)

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OPINION QUESTIONS WHICH STUDENTS ANSWERED DONT KNOW/NO RESPONSE

                             MEAN      SIGMA          RANGE            N
ID = 15008      MATH          .00        .03      0.00 -   .19        56
                ENGLISH       .03        .08      0.00 -   .48        78

RESPONSE OPP GIVEN TO STUDENTS PRESELECTED IN PATTERNED TURNS

                             MEAN      SIGMA          RANGE            N
ID = 15009      MATH          .30        .98      0.00 -  4.73        56
                ENGLISH      1.17       1.97      0.00 -  8.78        78

RESPONSE OPP GIVEN TO STUDENTS PRESELECTED IN NON-PATTERNED TURNS

                             MEAN      SIGMA          RANGE            N
ID = 15010      MATH          .37        .49      0.00 -  2.21        56
                ENGLISH       .50       1.02      0.00 -  5.60        78

RESPONSE OPPORTUNITIES GIVEN TO NON-VOLUNTEERS

                             MEAN      SIGMA          RANGE            N
ID = 15011      MATH         5.94       5.21       .05 - 18.72        56
                ENGLISH      5.10       4.65       .05 - 26.90        78

RESPONSE OPPORTUNITIES GIVEN TO VOLUNTEERS

                             MEAN      SIGMA          RANGE            N
ID = 15012      MATH         2.60       2.61       .10 - 10.99        56
                ENGLISH      2.97       3.23      0.00 - 17.05        78

RESPONSE OPPORTUNITIES WHICH STUDENTS ANSWERED BY CALLING OUT

                             MEAN      SIGMA          RANGE            N
ID = 15017      MATH         2.50       2.40       .18 - 11.63        56
                ENGLISH      2.08       1.68       .05 -  6.22        78

CORRECT ANSWERS

                             MEAN      SIGMA          RANGE            N
ID = 15019      MATH         9.47       6.15       .34 - 29.40        56
                ENGLISH      9.22       5.73       .02 - 20.29        78

INCORRECT ANSWERS

                             MEAN      SIGMA          RANGE            N
ID = 15020      MATH         1.75       1.18       .05 -  4.95        56
                ENGLISH      1.45       1.19      0.00 -  5.20        78
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Table 3.1 (cont.)

```
ANSWERS WHICH WERE DONT KNOW

                                 MEAN      SIGMA          RANGE          N
ID = 15021       MATH             .38        .32     0.00 -  1.31       56
                 ENGLISH          .37        .47     0.00 -  2.55       78

ANSWERS WHICH WERE NO RESPONSE

                                 MEAN      SIGMA          RANGE          N
ID = 15022       MATH             .43        .44     0.00 -  1.71       56
                 ENGLISH          .35        .37     0.00 -  2.25       78

CORRECT ANSWERS WHICH TEACHER PRAISED

                                 MEAN      SIGMA          RANGE          N
ID = 15023       MATH            1.30       1.55     0.00 -  7.35       56
                 ENGLISH         1.31       1.75     0.00 -  9.91       78

CORRECT ANSWERS AFTER WHICH TEACHER ASKED A NEW QUESTION

                                 MEAN      SIGMA          RANGE          N
ID = 15024       MATH             .82       1.39     0.00 -  7.30       56
                 ENGLISH          .67        .70     0.00 -  3.89       78

CORRECT ANSWERS AFTER WHICH TEACHER ASKED A NON-ACADEMIC QUESTION

                                 MEAN      SIGMA          RANGE          N
ID = 15025       MATH             .02        .03     0.00 -   .15       56
                 ENGLISH          .03        .07     0.00 -   .32       78

CORRECT ANSWERS WHICH TEACHER INTEGRATED INTO THE CLASS DISCUSSION

                                 MEAN      SIGMA          RANGE          N
ID = 15026       MATH            1.27       1.78     0.00 -  8.05       56
                 ENGLISH          .86       1.05     0.00 - 10.01       78

CORRECT ANSWERS AFTER WHICH TEACHER GAVE NO FEEDBACK

                                 MEAN      SIGMA          RANGE          N
ID = 15027       MATH             .10        .18     0.00 -   .79       56
                 ENGLISH          .18        .63     0.00 -  4.64       78

CORRECT ANSWERS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                                 MEAN      SIGMA          RANGE          N
ID = 15028       MATH             .45        .78     0.00 -  4.55       56
                 ENGLISH          .34        .50     0.00 -  2.01       78
```

Table 3.1 (cont.)

```
CORRECT ANSWERS AFTER WHICH TEACHER ASKS ANOTHER STUDENT

                                 MEAN      SIGMA          RANGE             N
ID = 15029     MATH               .02        .03      0.00 -    .13        56
               ENGLISH            .03        .11      0.00 -    .74        78

INCORRECT ANSWERS WHICH TEACHER CRITICIZED

                                 MEAN      SIGMA          RANGE             N
ID = 15030     MATH               .03        .05      0.00 -    .19        56
               ENGLISH            .03        .06      0.00 -    .23        78

INCORRECT ANSWERS AFTER WHICH TEACHER REPEATED THE QUESTION

                                 MEAN      SIGMA          RANGE             N
ID = 15031     MATH               .16        .10      0.00 -    .73        56
               ENGLISH            .13        .15      0.00 -    .76        78

INCORRECT ANSWERS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

                                 MEAN      SIGMA          RANGE             N
ID = 15032     MATH               .19        .19      0.00 -    .85        56
               ENGLISH            .19        .20      0.00 -   1.60        78

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED A NEW QUESTION

                                 MEAN      SIGMA          RANGE             N
ID = 15033     MATH               .13        .23      0.00 -    .91        56
               ENGLISH            .08        .15      0.00 -    .91        78

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED A NON-ACADEMIC QUESTION

                                 MEAN      SIGMA          RANGE             N
ID = 15034     MATH               .03        .05      0.00 -    .23        56
               ENGLISH            .04        .06      0.00 -    .30        78

INCORRECT ANSWERS WHICH TEACHER INTEGRATED INTO CLASS DISCUSSION

                                 MEAN      SIGMA          RANGE             N
ID = 15035     MATH               .04        .07      0.00 -    .42        56
               ENGLISH            .02        .05      0.00 -    .23        78

INCORRECT ANSWERS AFTER WHICH TEACHER GAVE NO FEEDBACK

                                 MEAN      SIGMA          RANGE             N
ID = 15036     MATH               .02        .08      0.00 -    .59        56
               ENGLISH            .02        .05      0.00 -    .33        78
```

Table 3.1 (cont.)

```
INCORRECT ANSWERS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                           MEAN     SIGMA        RANGE           N
ID = 15037     MATH         .24       .24     0.00 -  1.16      56
               ENGLISH      .12       .13     0.00 -   .60      78

INCORRECT ANSWERS AFTER WHICH TEACHER GAVE THE ANSWER

                           MEAN     SIGMA        RANGE           N
ID = 15038     MATH         .32       .34     0.00 -  1.37      56
               ENGLISH      .26       .26     0.00 -  1.04      78

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

                           MEAN     SIGMA        RANGE           N
ID = 15039     MATH         .44       .39     0.00 -  1.56      56
               ENGLISH      .35       .41     0.00 -  1.62      78

INCORRECT ANSWERS AFTER WHICH ANOTHER STUDENT CALLED OUT AN ANSWER

                           MEAN     SIGMA        RANGE           N
ID = 15040     MATH         .10       .14     0.00 -   .59      56
               ENGLISH      .09       .13     0.00 -   .78      78

DONT KNOW AND NO RESPONSE ANSWER WHICH TEACHER CRITICIZED

                           MEAN     SIGMA        RANGE           N
ID = 15041     MATH         .02       .04     0.00 -   .23      56
               ENGLISH      .03       .06     0.00 -   .37      78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER REPEATED QUESTION

                           MEAN     SIGMA        RANGE           N
ID = 15042     MATH         .07       .10     0.00 -   .46      56
               ENGLISH      .05       .06     0.00 -   .26      78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER SIMPLIFIED QUESTIONS

                           MEAN     SIGMA        RANGE           N
ID = 15043     MATH         .07       .10     0.00 -   .42      56
               ENGLISH      .06       .10     0.00 -  1.08      78

DONT KNOW/NO RESPONSE ANSWER AFTER WHICH TEACHER ASKS NEW QUESTION

                           MEAN     SIGMA        RANGE           N
ID = 15044     MATH         .06       .15     0.00 -   .79      56
               ENGLISH      .01       .03     0.00 -   .13      78
```

Table 3.1 (cont.)

```
DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER ASKED NON-ACADEMIC
QUESTION
                                MEAN      SIGMA         RANGE           N
ID = 15005      MATH             .02        .04     0.00 -   .17       56
                ENGLISH          .03        .05     0.00 -   .29       78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER GAVE PROCESS
FEEDBACK
                                MEAN      SIGMA         RANGE           N
ID = 15006      MATH             .03        .05     0.00 -   .25       56
                ENGLISH          .02        .04     0.00 -   .29       78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER GAVE THE ANSWER

                                MEAN      SIGMA         RANGE           N
ID = 15007      MATH             .08        .10     0.00 -   .52       56
                ENGLISH          .07        .10     0.00 -   .57       78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER ASKED OTHER STUDENT

                                MEAN      SIGMA         RANGE           N
ID = 15008      MATH             .36        .31     0.00 -  1.15       56
                ENGLISH          .35        .41     0.00 -  2.02       78

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH OTHER STUDENT CALLED OUT
ANSWER
                                MEAN      SIGMA         RANGE           N
ID = 15009      MATH             .06        .09     0.00 -   .48       56
                ENGLISH          .07        .12     0.00 -   .91       78

PROCESS QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

                                MEAN      SIGMA         RANGE           N
ID = 15050      MATH             .37        .42     0.00 -  1.88       56
                ENGLISH          .17        .22     0.00 -   .89       78

PRODUCT QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

                                MEAN      SIGMA         RANGE           N
ID = 15051      MATH            1.33        .87      .00 -  3.65       56
                ENGLISH         1.29       1.05     0.00 -  5.06       78

CHOICE QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

                                MEAN      SIGMA         RANGE           N
ID = 15052      MATH             .05        .08     0.00 -   .35       56
                ENGLISH          .04        .07     0.00 -   .35       78
```

Table 3.1 (cont.)

```
PROCESS QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW

                              MEAN      SIGMA          RANGE          N
ID = 15053     MATH            .09        .14      0.00 -   .63       56
               ENGLISH         .04        .08      0.00 -   .35       78

PRODUCT QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW

                              MEAN      SIGMA          RANGE          N
ID = 15054     MATH            .29        .23      0.00 -   .86       56
               ENGLISH         .30        .44      0.00 -  2.50       78

PROCESS QUESTIONS TO WHICH STUDENTS GAVE NO RESPONSE

                              MEAN      SIGMA          RANGE          N
ID = 15056     MATH            .08        .18      0.00 -  1.02       56
               ENGLISH         .04        .06      0.00 -   .37       78

PRODUCT QUESTIONS TO WHICH STUDENTS GAVE NO RESPONSE

                              MEAN      SIGMA          RANGE          N
ID = 15057     MATH            .34        .35      0.00 -  1.65       56
               ENGLISH         .29        .33      0.00 -  2.12       78

ANSWERS TO PROCESS QUESTIONS WHICH TEACHER PRAISED

                              MEAN      SIGMA          RANGE          N
ID = 15079     MATH            .31        .38      0.00 -  1.42       56
               ENGLISH         .28        .44      0.00 -  2.51       78

ANSWERS TO PRODUCT QUESTIONS WHICH TEACHER PRAISED

                              MEAN      SIGMA          RANGE          N
ID = 15080     MATH            .98       1.34      0.00 -  6.85       56
               ENGLISH        1.00       1.30      0.00 -  6.81       78

ANSWERS TO CHOICE  QUESTIONS WHICH TEACHER PRAISED

                              MEAN      SIGMA          RANGE          N
ID = 15081     MATH            .01        .02      0.00 -   .10       56
               ENGLISH         .04        .11      0.00 -   .70       78

ANSWERS TO OPINION QUESTIONS WHICH TEACHER PRAISED

                              MEAN      SIGMA          RANGE          N
ID = 15082     MATH            .00        .02      0.00 -   .09       56
               ENGLISH         .06        .11      0.00 -   .65       78
```

Table 3.1 (cont.)

```
ANSWER TO PROCESS QUESTIONS WHICH TEACHER CRITICIZED

                         MEAN      SIGMA          RANGE          N
ID = 15043     MATH       .01       .04       0.00 -   .23      56
               ENGLISH    .01       .02       0.00 -   .10      78

ANSWERS TO PRODUCT QUESTIONS WHICH TEACHER CRITICIZED

                         MEAN      SIGMA          RANGE          N
ID = 15046     MATH       .05       .06       0.00 -   .24      56
               ENGLISH    .05       .08       0.00 -   .37      78

PROCESS QUESTIONS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

                         MEAN      SIGMA          RANGE          N
ID = 15041     MATH       .07       .12       0.00 -   .68      56
               ENGLISH    .03       .05       0.00 -   .23      78

PROCESS QUESTIONS AFTER WHICH TEACHER GAVE NO FEEDBACK

                         MEAN      SIGMA          RANGE          N
ID = 15107     MATH       .02       .08       0.00 -   .59      56
               ENGLISH    .03       .11       0.00 -   .62      78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE NO FEEDBACK

                         MEAN      SIGMA          RANGE          N
ID = 15108     MATH       .11       .18       0.00 -   .79      56
               ENGLISH    .17       .51       0.00 -  3.09      78

PROCESS QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                         MEAN      SIGMA          RANGE          N
ID = 15111     MATH       .26       .51       0.00 -  3.07      56
               ENGLISH    .12       .23       0.00 -  1.10      78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                         MEAN      SIGMA          RANGE          N
ID = 15112     MATH       .31       .53       0.00 -  2.84      56
               ENGLISH    .35       .40       0.00 -  1.87      78

CHOICE QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                         MEAN      SIGMA          RANGE          N
ID = 15113     MATH       .02       .05       0.00 -   .32      56
               ENGLISH    .01       .03       0.00 -   .19      78
```

Table 3.1 (cont.)

```
OPINION QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

                                 MEAN     SIGMA          RANGE            N
ID = 15118     MATH               .01       .03      0.00 -   .23        56
               ENGLISH            .02       .05      0.00 -   .23        78

PROCESS QUESTIONS AFTER WHICH TEACHER GAVE THE ANSWER

                                 MEAN     SIGMA          RANGE            N
ID = 15115     MATH               .05       .07      0.00 -   .25        56
               ENGLISH            .04       .07      0.00 -   .28        78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE THE ANSWER

                                 MEAN     SIGMA          RANGE            N
ID = 15116     MATH               .34       .35      0.00 -  1.30        56
               ENGLISH            .28       .28      0.00 -  1.49        78

CHOICE QUESTIONS  AFTER WHICH TEACHER GAVE THE ANSWER

                                 MEAN     SIGMA          RANGE            N
ID = 15117     MATH               .02       .05      0.00 -   .30        56
               ENGLISH            .01       .03      0.00 -   .13        78

PROCESS QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

                                 MEAN     SIGMA          RANGE            N
ID = 15119     MATH               .15       .21      0.00 -   .95        56
               ENGLISH            .10       .14      0.00 -   .60        78

PRODUCT QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

                                 MEAN     SIGMA          RANGE            N
ID = 15120     MATH               .66       .52      0.00 -  2.17        56
               ENGLISH            .60       .60      0.00 -  2.25        78

CHOICE QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

                                 MEAN     SIGMA          RANGE            N
ID = 15121     MATH               .01       .03      0.00 -   .14        56
               ENGLISH            .02       .04      0.00 -   .23        78

OPINION QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

                                 MEAN     SIGMA          RANGE            N
ID = 15122     MATH               .01       .03      0.00 -   .23        56
               ENGLISH            .02       .06      0.00 -   .43        78
```

Table 3.1 (cont.)

```
PROCESS QUESTIONS AFTER WHICH ANOTHER STUDENT CALLED OUT ANSWER

                                 MEAN     SIGMA         RANGE          N
ID = 15123      MATH             .03       .05      0.00 -  .19       56
                ENGLISH          .01       .02      0.00 -  .09       78

PRODUCT QUESTIONS AFTER WHICH ANOTHER STUDENT CALLED OUT ANSWER

                                 MEAN     SIGMA         RANGE          N
ID = 15124      MATH             .13       .18      0.00 -  .77       56
                ENGLISH          .15       .23      0.00 - 1.64       78

PRESELECTED PATTERNED TURN STUDENTS WHOM TEACHER PRAISED

                                 MEAN     SIGMA         RANGE          N
ID = 15140      MATH             .02       .09      0.00 -  .63       56
                ENGLISH          .17       .47      0.00 - 2.79       78

PRESELECTED NON-PATTERNED TURN STUDENTS WHOM TEACHER PRAISED

                                 MEAN     SIGMA         RANGE          N
ID = 15141      MATH             .07       .12      0.00 -  .55       56
                ENGLISH          .08       .26      0.00 - 2.09       78

NON-VOLUNTEERS WHOM TEACHER PRAISED

                                 MEAN     SIGMA         RANGE          N
ID = 15142      MATH             .55       .92      0.00 - 4.86       56
                ENGLISH          .45       .64      0.00 - 3.84       78

VOLUNTEERS WHOM TEACHER PRAISED

                                 MEAN     SIGMA         RANGE          N
ID = 15143      MATH             .30       .32      0.00 - 1.01       56
                ENGLISH          .39       .66      0.00 - 4.26       78

CALL-OUT STUDENTS WHOM TEACHER PRAISED

                                 MEAN     SIGMA         RANGE          N
ID = 15144      MATH             .37       .57      0.00 - 2.46       56
                ENGLISH          .29       .48      0.00 - 2.33       78

NON-VOLUNTEERS WHOM TEACHER CRITICIZED

                                 MEAN     SIGMA         RANGE          N
ID = 15147      MATH             .04       .07      0.00 -  .40       56
                ENGLISH          .04       .08      0.00 -  .41       78
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Table 3.1 (cont.)

```
CALL-OUT STUDENTS WHOM TEACHER CRITICIZED

                              MEAN      SIGMA          RANGE          N
ID = 15149     MATH            .01        .02      0.00 -   .09      56
               ENGLISH         .01        .02      0.00 -   .10      78

VOLUNTEERS WHOM TEACHER GAVE PROCESS FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15183     MATH            .17        .29      0.00 -  1.54      56
               ENGLISH         .15        .22      0.00 -   .91      78

CALL-OUT STUDENTS WHOM TEACHER GAVE PROCESS FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15184     MATH            .18        .35      0.00 -  1.71      56
               ENGLISH         .13        .19      0.00 -   .90      78

STUDENT INITIATED QUESTIONS AND COMMENTS WHICH WERE QUESTIONS

                              MEAN      SIGMA          RANGE          N
ID = 15200     MATH           3.68       2.57       .50 - 11.79      56
               ENGLISH        2.90       2.00       .20 - 13.41      78

STUDENT INITIATED QUESTIONS AND COMMENTS WHICH WERE COMMENTS

                              MEAN      SIGMA          RANGE          N
ID = 15201     MATH           1.32       1.07      0.00 -  4.01      56
               ENGLISH        1.75       1.49       .05 -  7.46      78

STUDENT INITIATED QUESTIONS WHICH WERE CALLED OUT

                              MEAN      SIGMA          RANGE          N
ID = 15202     MATH           2.42       2.05       .04 - 10.03      56
               ENGLISH        2.08       1.86      0.00 - 12.48      78

STUDENT INITIATED CALLED OUT QUESTIONS WHICH WERE RELEVANT

                              MEAN      SIGMA          RANGE          N
ID = 15203     MATH           2.25       1.93       .04 -  9.54      56
               ENGLISH        1.93       1.77      0.00 - 12.17      78

STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND GIVEN FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15207     MATH           1.69       1.43       .04 -  6.54      56
               ENGLISH        1.63       1.55      0.00 - 11.11      78
```

Table 3.1 (cont.)

```
STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND GIVEN PROCESS
FEEDBACK
                                MEAN      SIGMA          RANGE          N
ID = 15238      MATH            .51        .56       0.00 -  2.96      56
                ENGLISH         .19        .22       0.00 -   .95      78

STU INITIATED RELEVANT QUESTIONS CALLED OUT AND INTEGRATED INTO CLASS

                                MEAN      SIGMA          RANGE          N
ID = 15239      MATH            .18        .31       0.00 -  1.85      56
                ENGLISH         .03        .07       0.00 -   .53      78

STUDENT INITIATED CALLED OUT QUESTIONS WHICH WERE IRRELEVANT

                                MEAN      SIGMA          RANGE          N
ID = 15240      MATH            .17        .25       0.00 -  1.16      56
                ENGLISH         .15        .18       0.00 -   .91      78

STUDENT INITIATED IRRELEVANT QUESTIONS CALLED OUT AND IGNORED

                                MEAN      SIGMA          RANGE          N
ID = 15241      MATH            .03        .07       0.00 -   .36      56
                ENGLISH         .03        .06       0.00 -   .32      78

STUDENT INITIATED IRRELEVANT QUESTIONS CALLED OUT AND NOT ACCEPTED

                                MEAN      SIGMA          RANGE          N
ID = 15242      MATH            .03        .05       0.00 -   .28      56
                ENGLISH         .02        .03       0.00 -   .13      78

STUDENT INITIATED IRRELEVANT QUESTIONS CALLED OUT AND GIVEN FEEDBACK

                                MEAN      SIGMA          RANGE          N
ID = 15243      MATH            .08        .16       0.00 -   .76      56
                ENGLISH         .09        .12       0.00 -   .52      78

STUDENT INITIATED QUESTIONS WHICH WERE NOT CALLED OUT

                                MEAN      SIGMA          RANGE          N
ID = 15244      MATH           1.75       1.22        .05 -  5.64      56
                ENGLISH         .82        .76       0.00 -  4.27      78

STUDENT INITIATED QUESTIONS WHICH WERE RELEVANT

                                MEAN      SIGMA          RANGE          N
ID = 15245      MATH           1.22       1.18        .05 -  5.59      56
                ENGLISH         .79        .74       0.00 -  4.17      78
```

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Table 3.1 (cont.)

```
STUDENT INITIATED RELEVANT QUESTIONS WHICH WERE GIVEN FEEDBACK

                              MEAN      SIGMA         RANGE         N
ID = 15217     MATH            .76        .78     0.00 -  3.65     56
               ENGLISH         .65        .65     0.00 -  3.73     78

STUDENT INITIATED RELEVANT QUESTIONS GIVEN PROCESS FEEDBACK

                              MEAN      SIGMA         RANGE         N
ID = 15218     MATH            .43        .46     0.00 -  2.45     56
               ENGLISH         .12        .10     0.00 -   .61     78

STUDENT INITIATED RELEVANT QUESTIONS WHICH WERE REDIRECTED

                              MEAN      SIGMA         RANGE         N
ID = 15219     MATH            .01        .03     0.00 -   .12     56
               ENGLISH         .02        .05     0.00 -   .29     78

STUDENT INITIATED RELEVANT QUESTIONS INTEGRATED INTO CLASS DISCUSSION

                              MEAN      SIGMA         RANGE         N
ID = 15220     MATH            .08        .15     0.00 -   .74     56
               ENGLISH         .02        .04     0.00 -   .19     78

STUDENT INITIATED QUESTIONS WHICH WERE IRRELEVANT

                              MEAN      SIGMA         RANGE         N
ID = 15221     MATH            .03        .05     0.00 -   .22     56
               ENGLISH         .04        .06     0.00 -   .26     78

STUDENT INITIATED IRRELEVANT QUESTIONS WHICH WERE GIVEN FEEDBACK

                              MEAN      SIGMA         RANGE         N
ID = 15222     MATH            .02        .04     0.00 -   .18     56
               ENGLISH         .02        .04     0.00 -   .18     78

STUDENT INITIATED COMMENTS WHICH WERE CALLED OUT

                              MEAN      SIGMA         RANGE         N
ID = 15223     MATH            .98        .88     0.00 -  3.39     56
               ENGLISH        1.30       1.19     0.00 -  5.03     78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE CALLED OUT

                              MEAN      SIGMA         RANGE         N
ID = 15224     MATH            .67        .58     0.00 -  2.65     56
               ENGLISH        1.02        .98     0.00 -  4.71     78
```

Table 3.1 (cont.)

```
STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND PRAISED

                              MEAN      SIGMA         RANGE          N
ID = 15225     MATH            .02        .04     0.00 -    .23     56
               ENGLISH         .03        .05     0.00 -    .18     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND CRITICIZED

                              MEAN      SIGMA         RANGE          N
ID = 15226     MATH            .02        .05     0.00 -    .36     56
               ENGLISH         .02        .03     0.00 -    .15     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND GIVEN FEEDBACK

                              MEAN      SIGMA         RANGE          N
ID = 15229     MATH            .08        .45     0.00 -   2.08     56
               ENGLISH         .03        .78     0.00 -   3.35     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND GIVEN PROCESS
FEEDBACK
                              MEAN      SIGMA         RANGE          N
ID = 15230     MATH            .09        .09     0.00 -    .36     56
               ENGLISH         .08        .10     0.00 -    .96     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND INTEGRATED INTO
DISCUSSION
                              MEAN      SIGMA         RANGE          N
ID = 15231     MATH            .02        .04     0.00 -    .19     56
               ENGLISH         .04        .10     0.00 -    .73     78

STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE CALLED OUT

                              MEAN      SIGMA         RANGE          N
ID = 15232     MATH            .31        .46     0.00 -   2.37     56
               ENGLISH         .28        .32     0.00 -   1.72     78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND CRITICIZED

                              MEAN      SIGMA         RANGE          N
ID = 15233     MATH            .02        .04     0.00 -    .22     56
               ENGLISH         .02        .03     0.00 -    .17     78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND IGNORED

                              MEAN      SIGMA         RANGE          N
ID = 15234     MATH            .15        .20     0.00 -   1.35     56
               ENGLISH         .12        .10     0.00 -    .52     78
```

Table 3.1 (cont.)

```
STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND NOT ACCEPTED

                             MEAN      SIGMA         RANGE            N
ID = 15235    MATH            .09        .07     0.00 -   .31        56
              ENGLISH         .04        .05     0.00 -   .19        78

STUDENT INITIATED IRRELLVANT COMMENTS CALLED OUT AND GIVEN FEEDBACK

                             MEAN      SIGMA         RANGE            N
ID = 15236    MATH            .12        .19     0.00 -   .94        56
              ENGLISH         .11        .16     0.00 -  1.02        78

STUDENT INITIATED COMMENTS WHICH WERE NOT CALLED OUT

                             MEAN      SIGMA         RANGE            N
ID = 15237    MATH            .35        .50     0.00 -  2.05        56
              ENGLISH         .46        .57     0.00 -  2.76        78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE NOT CALLED OUT

                             MEAN      SIGMA         RANGE            N
ID = 15238    MATH            .27        .39     0.00 -  1.52        56
              ENGLISH         .40        .49     0.00 -  2.38        78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE GIVEN PRAISE

                             MEAN      SIGMA         RANGE            N
ID = 15239    MATH            .02        .05     0.00 -   .23        56
              ENGLISH         .03        .05     0.00 -   .28        78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE GIVEN FEEDBACK

                             MEAN      SIGMA         RANGE            N
ID = 15240    MATH            .23        .30     0.00 -  1.20        56
              ENGLISH         .31        .37     0.00 -  2.04        78

STUDENT INITIATED RELEVANT COMMENTS GIVEN PROCESS FEEDBACK

                             MEAN      SIGMA         RANGE            N
ID = 15241    MATH            .06        .12     0.00 -   .58        56
              ENGLISH         .07        .12     0.00 -   .69        78

STUDENT INITIATED RELEVANT COMMENTS INTEGRATED INTO CLASS DISCUSSION

                             MEAN      SIGMA         RANGE            N
ID = 15242    MATH            .02        .03     0.00 -   .14        56
              ENGLISH         .05        .10     0.00 -  1.10        78
```

Table 3.1 (cont.)

```
STUDENT-INITIATED IRRELEVANT COMMENTS WHICH WERE NOT CALLED OUT

                                   MEAN      SIGMA          RANGE            N
ID = 15243     MATH                 .07        .13      0.00 -   .61        56
               ENGLISH              .06        .11      0.00 -   .55        78

STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE IGNORED

                                   MEAN      SIGMA          RANGE            N
ID = 15244     MATH                 .03        .07      0.00 -   .33        56
               ENGLISH              .02        .05      0.00 -   .32        78

STUDENTS INITIATED IRRELEVANT COMMENTS WHICH WERE NOT ACCEPTED

                                   MEAN      SIGMA          RANGE            N
ID = 15245     MATH                 .01        .03      0.00 -   .14        56
               ENGLISH              .01        .02      0.00 -   .13        78

STUDENTS INITIATED IRRELEVANT COMMENTS WHICH WERE GIVEN FEEDBACK

                                   MEAN      SIGMA          RANGE            N
ID = 15246     MATH                 .03        .06      0.00 -   .35        56
               ENGLISH              .03        .06      0.00 -   .24        78

STUDENT CREATED CONTACTS RELATED TO ACADEMIC CONTENT

                                   MEAN      SIGMA          RANGE            N
ID = 15247     MATH               10.62       5.56      2.95 - 33.78        56
               ENGLISH             7.64       4.65       .44 - 19.96        78

STUDENT CREATED CONTACTS RELATED TO CLASSROOM PROCEDURE

                                   MEAN      SIGMA          RANGE            N
ID = 15248     MATH                3.08       1.75       .57 -  8.33        56
               ENGLISH             4.72       2.72       .93 - 10.76        78

STUDENT CREATED ACADEMIC RELATED CONTACTS WHICH WERE PRAISED

                                   MEAN      SIGMA          RANGE            N
ID = 15249     MATH                 .25        .54      0.00 -  3.84        56
               ENGLISH              .17        .21      0.00 -  1.13        78

STUDENT CREATED ACADEMIC RELATED CONTACTS WHICH WERE CRITICIZED

                                   MEAN      SIGMA          RANGE            N
ID = 15250     MATH                 .12        .18      0.00 -  1.04        56
               ENGLISH              .10        .14      0.00 -   .67        78
```

Table 3.1 (cont.)

```
STUDENT CREATED ACADEMIC RELATED CONTACTS INVOLVING BRIEF TEACHER
CONTACT
                              MEAN      SIGMA          RANGE            N
ID = 15251     MATH           6.09       4.03      1.04 - 19.29        56
               ENGLISH        5.16       3.68       .34 - 18.28        78

STUDENT CREATED ACADEMIC RELATED CONTACTS INVOLVING LONG TEACHER
CONTACT
                              MEAN      SIGMA          RANGE            N
ID = 15252     MATH           4.34       2.33      1.05 - 12.98        56
               ENGLISH        2.37       1.64       .10 -  6.81        78

STUDENT CREATED ACADEMIC RELATED CONTACTS IN WHICH TEACHER DELAYS
CONTACT
                              MEAN      SIGMA          RANGE            N
ID = 15253     MATH            .19        .23      0.00 -  1.51        56
               ENGLISH         .11        .15      0.00 -   .78        78

STUDENT CREATED ACADEMIC RELATED CONTACTS GIVEN FEEDBACK

                              MEAN      SIGMA          RANGE            N
ID = 15254     MATH           5.14       3.28      1.00 - 16.32        56
               ENGLISH        5.03       3.66       .25 - 17.77        78

STUDENT CREATED ACADEMIC RELATED CONTACTS GIVEN PROCESS FEEDBACK

                              MEAN      SIGMA          RANGE            N
ID = 15255     MATH           4.89       2.76      1.04 - 15.95        56
               ENGLISH        2.24       1.63      0.00 -  7.24        78

STUDENT CREATED CONTACTS WHICH INVOLVED PERSONAL REQUEST

                              MEAN      SIGMA          RANGE            N
ID = 15256     MATH           1.14        .75       .09 -  3.50        56
               ENGLISH        1.09        .78       .09 -  3.52        78

STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER GRANTED

                              MEAN      SIGMA          RANGE            N
ID = 15257     MATH            .83        .58       .04 -  2.51        56
               ENGLISH         .85        .64      0.00 -  2.87        78

STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER DELAYED

                              MEAN      SIGMA          RANGE            N
ID = 15258     MATH            .07        .08      0.00 -   .43        56
               ENGLISH         .07        .07      0.00 -   .42        78
```

Table 3.1 (cont.)

```
STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER DID NOT GRANT

                                 MEAN      SIGMA          RANGE            N
ID = 15259     MATH               .29        .19      0.00 -    .76       56
               ENGLISH            .18        .15      0.00 -    .66       78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN BRIEF FEEDBACK

                                 MEAN      SIGMA          RANGE            N
ID = 15260     MATH              4.92       3.19       .73 -  16.13       56
               ENGLISH           4.80       3.56       .23 -  17.54       78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN BRIEF PROCESS FEEDBACK

                                 MEAN      SIGMA          RANGE            N
ID = 15261     MATH              1.00       1.31      0.00 -   5.74       56
               ENGLISH            .22        .32      0.00 -   1.66       78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN LONG FEEDBACK

                                 MEAN      SIGMA          RANGE            N
ID = 15262     MATH               .22        .23      0.00 -    .96       56
               ENGLISH            .23        .25      0.00 -   1.08       78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN LONG PROCESS FEEDBACK

                                 MEAN      SIGMA          RANGE            N
ID = 15263     MATH              3.89       2.20       .07 -  12.80       56
               ENGLISH           2.02       1.55      0.00 -   6.47       78

TEACHER INITIATED CONTACTS WHICH WERE ACADEMIC RELATED

                                 MEAN      SIGMA          RANGE            N
ID = 15264     MATH              3.28       2.38       .03 -  11.98       56
               ENGLISH           3.51       2.91       .05 -  15.52       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED PRAISE

                                 MEAN      SIGMA          RANGE            N
ID = 15265     MATH               .11        .19      0.00 -   1.33       56
               ENGLISH            .17        .17      0.00 -    .83       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED CRITICISM

                                 MEAN      SIGMA          RANGE            N
ID = 15266     MATH               .21        .28      0.00 -   1.04       56
               ENGLISH            .22        .30      0.00 -   1.57       78
```

Table 3.1 (cont.)

```
TEACHER INITIATED ACADEMIC CONTACTS WHICH WERE BRIEF

                              MEAN      SIGMA          RANGE          N
ID = 15267     MATH           1.78       1.41      .29 -  7.75       56
               ENGLISH        2.19       2.57     0.00 - 15.00       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH WERE LONG

                              MEAN      SIGMA          RANGE          N
ID = 15268     MATH            .98        .72      .05 -  3.42       56
               ENGLISH         .84        .76     0.00 -  4.00       78

TEACHER INITIATED ACADEMIC CONTACTS INVOLVING OBSERVATION OF STUDENT

                              MEAN      SIGMA          RANGE          N
ID = 15269     MATH            .53        .68     0.00 -  4.03       56
               ENGLISH         .47        .60     0.00 -  2.52       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15270     MATH           1.73       1.41      .18 -  7.70       56
               ENGLISH        2.23       2.58     0.00 - 10.80       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED PROCESS FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15271     MATH            .89        .68      .09 -  2.98       56
               ENGLISH         .69        .66      .04 -  3.09       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED BRIEF FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15272     MATH           1.61       1.34      .18 -  7.01       56
               ENGLISH        2.09       2.54     0.00 - 10.74       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED BRIEF PROCESS
FEEDBACK
                              MEAN      SIGMA          RANGE          N
ID = 15273     MATH            .14        .14     0.00 -   .57       56
               ENGLISH         .08        .07     0.00 -   .29       78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED LONG FEEDBACK

                              MEAN      SIGMA          RANGE          N
ID = 15274     MATH            .12        .18     0.00 -   .92       56
               ENGLISH         .14        .16     0.00 -   .71       78
```

Table 3.1 (cont.)

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED LONG PROCESS FEEDBACK

		MEAN	SIGMA	RANGE	N
ID = 15275	MATH	.79	.60	.05 - 2.47	56
	ENGLISH	.65	.64	0.00 - 2.81	78

TEACHER INITIATED CONTACTS WHICH RELATED TO CLASSROOM PROCEDURE

		MEAN	SIGMA	RANGE	N
ID = 15276	MATH	1.82	1.23	.30 - 7.16	56
	ENGLISH	2.36	1.84	.07 - 4.51	78

MISBEHAVIORS TO WHICH TEACHER RESPONDED BUT CODER DID NOT OBSERVE

		MEAN	SIGMA	RANGE	N
ID = 15277	MATH	.06	.12	0.00 - .85	56
	ENGLISH	.04	.05	0.00 - .22	78

NONDISRUPTIVE MISBEHAVIORS (DAYDREAMING, WASTING TIME)

		MEAN	SIGMA	RANGE	N
ID = 15278	MATH	1.87	1.14	.12 - 4.86	56
	ENGLISH	2.11	1.67	.10 - 7.97	78

MISBEHAVIORS INVOLVING STUDENTS SOCIALIZING

		MEAN	SIGMA	RANGE	N
ID = 15279	MATH	1.62	1.10	.04 - 4.54	56
	ENGLISH	1.89	1.54	.18 - 9.26	78

STUDENTS BEING LATE TO CLASS

		MEAN	SIGMA	RANGE	N
ID = 15280	MATH	.05	.07	0.00 - .36	56
	ENGLISH	.04	.06	0.00 - .31	78

DISRUPTIVE MISBEHAVIORS (LOUD TALKING, DISTURBING OTHERS)

		MEAN	SIGMA	RANGE	N
ID = 15281	MATH	.69	.93	0.00 - 4.84	56
	ENGLISH	.68	.94	0.00 - 5.11	78

MISBEHAVIORS DURING WHICH STUDENTS SASSED OR DEFIED TEACHER

		MEAN	SIGMA	RANGE	N
ID = 15282	MATH	.18	.40	0.00 - 2.88	56
	ENGLISH	.16	.24	0.00 - 1.17	78

Table 3.1 (cont.)

```
SERIOUS MISBEHAVIORS WHICH TEACHER HANDLED WITHOUT ERROR

                                 MEAN      SIGMA          RANGE          N
ID = 15388      MATH              .65        .89     0.00 -  5.71       56
                ENGLISH           .77       1.07     0.00 -  5.66       78

SERIOUS MISBEHAVIORS FOR WHICH TEACHER MADE A TARGET ERROR

                                 MEAN      SIGMA          RANGE          N
ID = 15389      MATH              .03        .04     0.00 -   .18       56
                ENGLISH           .02        .04     0.00 -   .23       78

SERIOUS MISBEHAVIORS FOR WHICH TEACHER MADE A TIMING ERROR

                                 MEAN      SIGMA          RANGE          N
ID = 15390      MATH              .15        .34     0.00 -  2.22       56
                ENGLISH           .07        .15     0.00 -  1.09       78

DYADIC CONTACTS

                                 MEAN      SIGMA          RANGE          N
ID = 15392      MATH            43.69      11.68    21.70 - 76.74       56
                ENGLISH         41.60      13.94     3.41 - 76.45       78

PUBLIC RESPONSE OPPORTUNITIES

                                 MEAN      SIGMA          RANGE          N
ID = 15393      MATH            11.71       7.64      .77 - 28.80       56
                ENGLISH         11.92       7.45      .56 - 30.02       78

BEHAVIORAL CONTACTS

                                 MEAN      SIGMA          RANGE          N
ID = 15394      MATH             5.18       3.53      .15 - 16.01       56
                ENGLISH          5.39       4.19      .49 - 23.06       78

ACADEMIC PRAISE

                                 MEAN      SIGMA          RANGE          N
ID = 15395      MATH             1.74       1.77      .05 -  8.60       56
                ENGLISH          1.80       1.93     0.00 - 11.12       78

ACADEMIC CRITICISM

                                 MEAN      SIGMA          RANGE          N
ID = 15396      MATH              .48        .50     0.00 -  2.47       56
                ENGLISH           .45        .44     0.00 -  2.11       78
```

Table 3.1 (cont.)

```
MINUTES TEACHER SPENT OUT OF CLASSROOM

                             MEAN      SIGMA          RANGE            N
ID = 15377     MATH           .55        .84      0.00 -  4.39        56
               ENGLISH        .69        .87      0.00 -  4.43        78

MINUTES OF TESTING TIME

                             MEAN      SIGMA          RANGE            N
ID = 15378     MATH          2.18       2.09      0.00 -  8.94        56
               ENGLISH       2.88       1.70      0.00 -  6.72        78

MINUTES IN OTHER (UNSPECIFIED)

                             MEAN      SIGMA          RANGE            N
ID = 15379     MATH          1.79       1.78      0.00 -  7.44        56
               ENGLISH       4.21       3.05       .09 - 15.24        78

NUMBER OF PEER TUTORING SITUATIONS

                             MEAN      SIGMA          RANGE            N
ID = 15381     MATH           .03        .07      0.00 -   .28        56
               ENGLISH        .03        .06      0.00 -   .38        78

MILD MISBEHAVIORS WHICH TEACHER HANDLED WITHOUT ERROR

                             MEAN      SIGMA          RANGE            N
ID = 15384     MATH          3.13       1.76       .15 -  8.23        56
               ENGLISH       3.66       2.67       .44 - 15.44        78

MILD MISBEHAVIORS FOR WHICH TEACHER MADE A TARGET ERROR

                             MEAN      SIGMA          RANGE            N
ID = 15385     MATH           .06        .08      0.00 -   .31        56
               ENGLISH        .07        .09      0.00 -   .47        78

MILD MISBEHAVIORS FOR WHICH TEACHER MADE A TIMING ERROR

                             MEAN      SIGMA          RANGE            N
ID = 15386     MATH           .18        .20      0.00 -  1.28        56
               ENGLISH        .18        .32      0.00 -  2.07        78

MILD MISBEHAVIORS TO WHICH TEACHER OVERREACTED

                             MEAN      SIGMA          RANGE            N
ID = 15387     MATH           .03        .08      0.00 -   .36        56
               ENGLISH        .05        .10      0.00 -   .70        78
```

Table 3.1 (cont.)

```
MINUTES IN GROUP DISCIPLINE

                          MEAN      SIGMA          RANGE          N
ID = 15369    MATH         .68        .90      0.00 -  4.62      56
              ENGLISH      .69       1.00      0.00 -  6.51      78

MINUTES IN LECTURE DEMONSTRATION

                          MEAN      SIGMA          RANGE          N
ID = 15370    MATH       18.03       4.64      2.01 - 20.56      56
              ENGLISH     4.73       3.36      0.00 - 14.66      78

MINUTES IN DISCUSSION

                          MEAN      SIGMA          RANGE          N
ID = 15371    MATH        5.40       3.98       .09 - 15.37      56
              ENGLISH     6.89       4.24       .93 - 19.21      78

MINUTES IN DRILL

                          MEAN      SIGMA          RANGE          N
ID = 15372    MATH         .44        .69      0.00 -  2.50      56
              ENGLISH      .56        .94      0.00 -  3.75      78

MINUTES IN SPECIAL ACTIVITIES (NOT INCLUDED IN PREVIOUS CATEGORIES)

                          MEAN      SIGMA          RANGE          N
ID = 15373    MATH        1.89       1.70      0.00 -  7.36      56
              ENGLISH     3.13       2.48      0.00 - 11.12      78

MINUTES IN ADVANCE ORGANIZERS

                          MEAN      SIGMA          RANGE          N
ID = 15374    MATH        2.54       1.20       .71 -  5.84      56
              ENGLISH     3.41       1.60      1.22 -  8.34      78

MINUTES IN LOST TIME

                          MEAN      SIGMA          RANGE          N
ID = 15375    MATH        1.42       1.73      0.00 -  7.28      56
              ENGLISH     1.45       1.92      0.00 -  9.84      78

MINUTES IN INDIVIDUAL SELF-PACED WORK

                          MEAN      SIGMA          RANGE          N
ID = 15376    MATH        1.15       3.08      0.00 - 12.74      56
              ENGLISH     1.67       3.86      0.00 - 15.18      78
```

Table 3.1 (cont.)

```
STUDENT CREATED SOCIAL CONTACTS WHICH WERE NOT ACCEPTED

                              MEAN      SIGMA         RANGE          N
ID = 15342     MATH            .08        .10     0.00 -   .53      56
               ENGLISH         .06        .09     0.00 -   .37      78

MINUTES IN PEER TUTORING

                              MEAN      SIGMA         RANGE          N
ID = 15362     MATH            .15        .40     0.00 -  2.00      56
               ENGLISH         .09        .34     0.00 -  2.33      78

MINUTES IN SMALL GROUP, TEACHER CONTROLLED

                              MEAN      SIGMA         RANGE          N
ID = 15363     MATH            .27        .90     0.00 -  6.05      56
               ENGLISH         .17        .44     0.00 -  2.51      78

MINUTES IN SMALL GROUP, NOT TEACHER CONTROLLED

                              MEAN      SIGMA         RANGE          N
ID = 15364     MATH            .32        .98     0.00 -  5.11      56
               ENGLISH         .37        .84     0.00 -  3.87      78

MINUTES AT BOARD

                              MEAN      SIGMA         RANGE          N
ID = 15365     MATH           1.48       3.08     0.00 - 18.80      56
               ENGLISH         .25        .47     0.00 -  2.25      78

MINUTES IN INDIVIDUAL SEATWORK

                              MEAN      SIGMA         RANGE          N
ID = 15366     MATH          23.56       7.02     0.36 - 36.18      56
               ENGLISH       21.92       7.10     0.88 - 36.37      78

MINUTES IN TRANSITIONS

                              MEAN      SIGMA         RANGE          N
ID = 15367     MATH           1.49       1.24     0.00 -  5.58      56
               ENGLISH        1.19       1.02     0.00 -  5.31      78

MINUTES TEACHER SPENT IN IDLE CHIT-CHAT WITH STUDENTS

                              MEAN      SIGMA         RANGE          N
ID = 15368     MATH            .75        .98     0.00 -  3.79      56
               ENGLISH         .88       1.17     0.00 -  6.60      78
```

Table 3.1 (cont.)

```
LEAVING ROOM WITHOUT PERMISSION RESPONDED TO WITH MANAGEMENT REQUEST

                            MEAN      SIGMA          RANGE          N
ID = 15330    MATH           .02        .07      0.00 -   .40      56
              ENGLISH        .01        .03      0.00 -   .17      78

STUDENT CONTRABAND WHICH TEACHER HANDLES WITH MANAGEMENT REQUEST

                            MEAN      SIGMA          RANGE          N
ID = 15332    MATH           .03        .05      0.00 -   .27      56
              ENGLISH        .03        .06      0.00 -   .26      78

STUDENT BAITS TEACHER AND TEACHER HANDLES WITH MANAGEMENT REQUEST

                            MEAN      SIGMA          RANGE          N
ID = 15334    MATH           .03        .08      0.00 -   .46      56
              ENGLISH        .03        .08      0.00 -   .41      78

MISBEHAVIORS NOT IN ABOVE CATEGORIES THAT INVOLVED MANAGEMENT REQUEST

                            MEAN      SIGMA          RANGE          N
ID = 15337    MATH           .03        .06      0.00 -   .22      56
              ENGLISH        .02        .05      0.00 -   .24      78

MISBEHAVIORS NOT IN ABOVE CATEGORIES WHICH TEACHER CRITICIZED

                            MEAN      SIGMA          RANGE          N
ID = 15338    MATH           .02        .05      0.00 -   .19      56
              ENGLISH        .01        .02      0.00 -   .09      78

TEACHER INITIATED CONTACTS WHICH WERE SOCIAL

                            MEAN      SIGMA          RANGE          N
ID = 15339    MATH           .30        .33      0.00 -  1.46      56
              ENGLISH        .35        .42      0.00 -  2.53      78

STUDENT CREATED CONTACTS WHICH WERE SOCIAL

                            MEAN      SIGMA          RANGE          N
ID = 15340    MATH           .94        .79      0.00 -  3.16      56
              ENGLISH       1.09       1.17      0.00 -  8.00      78

STUDENT CREATED SOCIAL CONTACTS WHICH WERE ACCEPTED

                            MEAN      SIGMA          RANGE          N
ID = 15341    MATH           .86        .72      0.00 -  2.92      56
              ENGLISH       1.03       1.13      0.00 -  7.86      78
```

Table 3.1 (cont.)

```
DISRUPTIVE MISBEHAVIOR, WHICH TEACHER CRITICIZED

                              MEAN      SIGMA          RANGE          N
ID = 15320     MATH            .13        .16      0.00 -   .64      56
               ENGLISH         .13        .19      0.00 -   .99      78

DISRUPTIVE MISBEHAVIOR, IN WHICH TEACHER THREATENED STUDENT

                              MEAN      SIGMA          RANGE          N
ID = 15321     MATH            .05        .09      0.00 -   .46      56
               ENGLISH         .05        .10      0.00 -   .60      78

DEFIANCE OF TEACHER RESPONDED TO WITH A MANAGEMENT REQUEST

                              MEAN      SIGMA          RANGE          N
ID = 15322     MATH            .07        .13      0.00 -   .91      56
               ENGLISH         .08        .14      0.00 -   .60      78

DEFIANCE OF TEACHER WHICH TEACHER CRITICIZED

                              MEAN      SIGMA          RANGE          N
ID = 15323     MATH            .04        .10      0.00 -   .69      56
               ENGLISH         .02        .05      0.00 -   .26      78

DEFIANCE OF TEACHER RESPONDED TO WITH TEACHER THREATENING STUDENT

                              MEAN      SIGMA          RANGE          N
ID = 15324     MATH            .02        .05      0.00 -   .22      56
               ENGLISH         .01        .03      0.00 -   .16      78

STUDENT VERBAL AGRESSION HANDLED BY A MANAGEMENT REQUEST

                              MEAN      SIGMA          RANGE          N
ID = 15325     MATH            .02        .07      0.00 -   .50      56
               ENGLISH         .02        .05      0.00 -   .27      78

STUDENT PHYSICAL AGGRESSION HANDLED BY MANAGEMENT REQUEST

                              MEAN      SIGMA          RANGE          N
ID = 15327     MATH            .04        .08      0.00 -   .54      56
               ENGLISH         .03        .06      0.00 -   .34      78

STUDENT PHYSICAL AGGRESSION WHICH TEACHER CRITICIZED

                              MEAN      SIGMA          RANGE          N
ID = 15328     MATH            .01        .02      0.00 -   .09      56
               ENGLISH         .01        .03      0.00 -   .16      78
```

Table 3.1 (cont.)

```
SOCIALIZING MISBEHAVIORS IN WHICH TEACHER INTERVENED NONVERBALLY

                          MEAN      SIGMA          RANGE          N
ID = 153.1    MATH         .06        .08      0.00 -   .28      56
              ENGLISH      .09        .11      0.00 -   .45      78

SOCIALIZING MISBEHAVIORS INVOLVING A MANAGEMENT REQUEST

                          MEAN      SIGMA          RANGE          N
ID = 153.2    MATH        1.17        .81       .04 -  3.67      56
              ENGLISH     1.45       1.30       .05 -  8.38      78

SOCIALIZING MISBEHAVIORS IN WHICH TEACHER CRITICIZED STUDENT

                          MEAN      SIGMA          RANGE          N
ID = 153.3    MATH         .25        .28      0.00 -  1.17      56
              ENGLISH      .23        .27      0.00 -  1.39      78

SOCIALIZING MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

                          MEAN      SIGMA          RANGE          N
ID = 153.4    MATH         .12        .17      0.00 -   .76      56
              ENGLISH      .11        .11      0.00 -   .97      78

TARDINESS GIVEN A MANAGEMENT REQUEST

                          MEAN      SIGMA          RANGE          N
ID = 153.5    MATH         .03        .05      0.00 -   .27      56
              ENGLISH      .02        .04      0.00 -   .22      78

MISBEHAVIORS INVOLVING TARDINESS WHICH TEACHER CRITICIZED

                          MEAN      SIGMA          RANGE          N
ID = 153.6    MATH         .01        .03      0.00 -   .14      56
              ENGLISH      .01        .03      0.00 -   .14      78

DISRUPTIVE MISBEHAVIORS IN WHICH TEACHER INTERVENED NONVERBALLY

                          MEAN      SIGMA          RANGE          N
ID = 153.8    MATH         .04        .09      0.00 -   .44      56
              ENGLISH      .03        .06      0.00 -   .28      78

DISRUPTIVE MISBEHAVIORS INVOLVING A MANAGEMENT REQUEST

                          MEAN      SIGMA          RANGE          N
ID = 153.9    MATH         .35        .43      0.00 -  2.12      56
              ENGLISH      .40        .67      0.00 -  3.76      78
```

Table 3.1 (cont.)

```
MISBEHAVIORS IN WHICH TEACHER DELAYED THREAT (TIMING ERROR)

                              MEAN      SIGMA          RANGE            N
ID = 15302     MATH            .03        .06      0.00 -   .32        56
               ENGLISH         .03        .08      0.00 -   .52        78

MISBEHAVIORS IN WHICH TEACHER OVERREACTED  WITH THREAT

                              MEAN      SIGMA          RANGE            N
ID = 15303     MATH            .01        .05      0.00 -   .31        56
               ENGLISH         .01        .03      0.00 -   .19        78

MISBEHAVIORS INVOLVING MANAGEMENT REQUEST THAT CODER DID NOT OBSERVE

                              MEAN      SIGMA          RANGE            N
ID = 15304     MATH            .03        .06      0.00 -   .40        56
               ENGLISH         .02        .03      0.00 -   .14        78

MISBEHAVIORS WHICH TEACHER CRITICIZED THAT CODER DID NOT OBSERVE

                              MEAN      SIGMA          RANGE            N
ID = 15305     MATH            .02        .04      0.00 -   .14        56
               ENGLISH         .01        .03      0.00 -   .17        78

MILD MISBEHAVIORS WHERE TEACHER INTERVENED NONVERBALLY

                              MEAN      SIGMA          RANGE            N
ID = 15307     MATH            .06        .10      0.00 -   .64        56
               ENGLISH         .07        .08      0.00 -   .29        78

MILD MISBEHAVIORS INVOLVING MANAGEMENT REQUEST FROM TEACHER

                              MEAN      SIGMA          RANGE            N
ID = 15308     MATH           1.40        .83       .12 -  3.51        56
               ENGLISH        1.65       1.37       .05 -  6.37        78

MILD MISBEHAVIORS WHICH TEACHER CRITICIZED

                              MEAN      SIGMA          RANGE            N
ID = 15309     MATH            .28        .30      0.00 -  1.51        56
               ENGLISH         .25        .31      0.00 -  1.71        78

MILD MISBEHAVIORS WHERE TEACHER THREATENED STUDENT

                              MEAN      SIGMA          RANGE            N
ID = 15310     MATH            .07        .08      0.00 -   .36        56
               ENGLISH         .09        .11      0.00 -   .46        78
```

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Table 3.1 (cont.)

```
MNGMNT REQUEST AFTER MISBEHAVIOR DIRECTED TO WRONG STUDENT (TARGET
ERROR)
                                  MEAN      SIGMA          RANGE          N
ID = 15244      MATH               .08        .08      0.00 -   .36      56
                ENGLISH            .07        .11      0.00 -   .47      78

MISBEHAVIORS IN WHICH TEACHER DELAYED MANAGEMENT REQUEST (TIMING ERROR)

                                  MEAN      SIGMA          RANGE          N
ID = 15245      MATH               .22        .41      0.00 -  2.42      56
                ENGLISH            .17        .24      0.00 -   .91      78

TEACHER OVERREACTED WITH A MANAGEMENT REQUEST TO STUDENT MISBEHAVIORS

                                  MEAN      SIGMA          RANGE          N
ID = 15246      MATH               .01        .02      0.00 -   .09      56
                ENGLISH            .01        .02      0.00 -   .14      78

MISBEHAVIORS WHICH TEACHER CRITICIZED

                                  MEAN      SIGMA          RANGE          N
ID = 15247      MATH               .67        .66      0.00 -  2.93      56
                ENGLISH            .60        .55      0.00 -  2.67      78

MISBEHAVIORS IN WHICH TEACHER CRITICIZED WRONG STUDENT (TARGET ERROR)

                                  MEAN      SIGMA          RANGE          N
ID = 15248      MATH               .02        .04      0.00 -   .19      56
                ENGLISH            .01        .03      0.00 -   .17      78

MISBEHAVIORS IN WHICH TEACHER DELAYED CRITICISM (TIMING ERROR)

                                  MEAN      SIGMA          RANGE          N
ID = 15249      MATH               .08        .14      0.00 -   .64      56
                ENGLISH            .05        .14      0.00 -   .95      78

MISBEHAVIORS IN WHICH TEACHER OVERREACTED WITH CRITICISM

                                  MEAN      SIGMA          RANGE          N
ID = 15300      MATH               .03        .06      0.00 -   .33      56
                ENGLISH            .03        .09      0.00 -   .70      78

MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

                                  MEAN      SIGMA          RANGE          N
ID = 15301      MATH               .23        .24      0.00 -  1.39      56
                ENGLISH            .24        .23      0.00 -  1.29      78
```

Table 3.1 (cont.)

```
MISBEHAVIORS DURING WHICH STUDENT WAS VERBALLY AGGRESSIVE

                              MEAN      SIGMA         RANGE            N
ID # 15283     MATH            .04        .10      0.00 -    .73      56
               ENGLISH         .04        .06      0.00 -    .32      78

MISBEHAVIORS DURING WHICH STUDENT WAS PHYSICALLY AGGRESSIVE

                              MEAN      SIGMA         RANGE            N
ID # 15284     MATH            .07        .12      0.00 -    .58      56
               ENGLISH         .06        .09      0.00 -    .54      78

MISBEHAVIORS INVOLVING STUDENTS LEAVING CLASS WITHOUT PERMISSION

                              MEAN      SIGMA         RANGE            N
ID # 15285     MATH            .04        .08      0.00 -    .40      56
               ENGLISH         .03        .06      0.00 -    .35      78

MISBEHAVIORS INVOLVING CONTRABAND ITEMS (KNIVES, RADIOS)

                              MEAN      SIGMA         RANGE            N
ID # 15286     MATH            .05        .08      0.00 -    .36      56
               ENGLISH         .04        .07      0.00 -    .26      78

MISBEHAVIORS INVOLVING STUDENTS BAITING TEACHER

                              MEAN      SIGMA         RANGE            N
ID # 15287     MATH            .08        .18      0.00 -   1.19      56
               ENGLISH         .07        .14      0.00 -    .69      78

MISBEHAVIORS INVOLVING STUDENT SLEEPING IN CLASS

                              MEAN      SIGMA         RANGE            N
ID # 15289     MATH            .06        .11      0.00 -    .51      56
               ENGLISH         .03        .06      0.00 -    .29      78

MISBEHAVIORS IN WHICH TEACHER INTERVENED NON-VERBALLY

                              MEAN      SIGMA         RANGE            N
ID # 15292     MATH            .16        .20      0.00 -    .96      56
               ENGLISH         .24        .19      0.00 -    .85      78

MISBEHAVIORS WHICH INVOLVED MANAGEMENT REQUEST FROM TEACHER

                              MEAN      SIGMA         RANGE            N
ID # 15293     MATH           2.92       1.73       .15 -   8.18      56
               ENGLISH        3.54       3.00       .10 -  17.84      78
```

Table 3.1 (cont.)

```
SUSTAINING FEEDBACK GIVEN AN INCORRELT RESPONSE

                                MEAN       SIGMA          RANGE           N
ID = 15397      MATH             .48         .44      0.00 -  2.85       56
                ENGLISH          .40         .45      0.00 -  2.37       78

SUSTAINING FEEDBACK GIVEN A DONT KNOW OR NO RESPONSE

                                MEAN       SIGMA          RANGE           N
ID = 15398      MATH             .20         .27      0.00 -  1.31       56
                ENGLISH          .13         .19      0.00 -  1.42       78

SUSTAINING FEEDBACK

                                MEAN       SIGMA          RANGE           N
ID = 15399      MATH            1.54        1.94       .05 -  9.49       56
                ENGLISH         1.26        1.23      0.00 -  7.86       78

STUDENT INITIATED DYADIC CONTACTS

                                MEAN       SIGMA          RANGE           N
ID = 15400      MATH           28.72        7.90      4.58 - 48.68       56
                ENGLISH        17.36        7.87      3.05 - 37.79       78

PROCEDURAL CONTACTS

                                MEAN       SIGMA          RANGE           N
ID = 15401      MATH            5.50        2.51      1.55 - 12.78       56
                ENGLISH         7.08        3.37      1.44 - 17.42       78

SOCIAL CONTACTS

                                MEAN       SIGMA          RANGE           N
ID = 15402      MATH            1.24        1.84       .05 -  4.37       56
                ENGLISH         1.44        1.46      0.00 -  9.76       78

BEHAVIORAL CRITICISM

                                MEAN       SIGMA          RANGE           N
ID = 15404      MATH             .80         .72      0.00 -  3.34       56
                ENGLISH          .71         .72      0.00 -  3.81       78

BEHAVIORAL CRITILISM WHICH INVOLVED A THREAT

                                MEAN       SIGMA          RANGE           N
ID = 15405      MATH            1.89         .93      0.00 -  5.04       56
                ENGLISH         1.00         .88       .05 -  4.37       78
```

Table 3.1 (cont.)

```
BEHAVIORAL INTERVENTION IN WHICH THERE WAS NO ERROR

                              MEAN      SIGMA          RANGE           N
ID = 15406     MATH           3.98       2.07      .15 - 12.29        56
               ENGLISH        4.58       3.62      .44 - 20.83        78

MILD MISBEHAVIORS

                              MEAN      SIGMA          RANGE           N
ID = 15407     MATH           3.44       1.93      .15 -  9.48        56
               ENGLISH        3.96       2.98      .44 - 16.57        78

SERIOUS MISBEHAVIORS

                              MEAN      SIGMA          RANGE           N
ID = 15408     MATH           1.36       1.45     0.00 -  8.00        56
               ENGLISH        1.41       1.26     0.00 -  6.26        78

REINFORCING DYADIC CONTACTS

                              MEAN      SIGMA          RANGE           N
ID = 15409     MATH           2.57       1.71      .05 -  9.53        56
               ENGLISH        2.55       1.90      .36 - 11.26        78

AVERSIVE DYADIC CONTACTS

                              MEAN      SIGMA          RANGE           N
ID = 15410     MATH           7.30       3.85     1.61 - 20.23        56
               ENGLISH        7.25       4.53     1.38 - 27.03        78

PRIVATE STUDENT CREATED CONTACTS

                              MEAN      SIGMA          RANGE           N
ID = 15411     MATH          16.38       6.73     4.86 - 41.59        56
               ENGLISH       14.50       7.13     3.00 - 33.93        78

PRIVATE TEACHER INITIATED CONTACTS

                              MEAN      SIGMA          RANGE           N
ID = 15412     MATH           5.71       3.06     1.58 - 15.59        56
               ENGLISH        6.22       3.38     1.00 - 17.66        78

STUDENT INITIATED QUESTIONS AND COMMENTS

                              MEAN      SIGMA          RANGE           N
ID = 15413     MATH           5.40       3.44      .50 - 18.89        56
               ENGLISH        4.66       3.19      .25 - 17.83        78
```

TABLE 3.2

LOW-INFERENCE PROPORTION VARIABLES

```
RESPONSE OPPORTUNITIES GENERATED BY PROCESS QUESTIONS

FORMULA:  1/1+2+3+4
                                MEAN      SIGMA          RANGE           N
ID = 00001      MATH             .16        .11      0.00 -   .45       56
                ENGLISH          .14        .11       .00 -   .59       78

RESPONSE OPPORTUNITIES GENERATED BY PRODUCT QUESTIONS

FORMULA:  2/1+2+3+4
                                MEAN      SIGMA          RANGE           N
ID = 00002      MATH             .80        .12       .52 -  1.00       56
                ENGLISH          .78        .14       .39 -   .98       78

RESPONSE OPPORTUNITIES GENERATED BY CHOICE QUESTIONS

FORMULA:  3/1+2+3+4
                                MEAN      SIGMA          RANGE           N
ID = 00003      MATH             .03        .04      0.00 -   .17       56
                ENGLISH          .03        .05      0.00 -   .32       78

RESPONSE OPPORTUNITIES GENERATED BY OPINION QJESTIONS

FORMULA:  4/1+2+3+4
                                MEAN      SIGMA          RANGE           N
ID = 00004      MATH             .01        .05      0.00 -   .31       56
                ENGLISH          .05        .08      0.00 -   .56       78

PROCESS QUESTIONS WHICH STUDENTS ANSWERED CORRECTLY

FORMULA:  5/1
                                MEAN      SIGMA          RANGE           N
ID = 00005      MATH             .75        .13       .42 -  1.00       54
                ENGLISH          .81        .18      0.00 -  1.00       78
```

Table 3.2 (cont.)

```
PRODUCE QUESTIONS WHICH STUDENTS ANSWERED CORRECTLY

FORMULA:  6/2

                                MEAN      SIGMA          RANGE           N
ID = 00006      MATH             .78        .08       .50 -   .95       56
                ENGLISH          .82        .07       .55 -  1.00       78

CHOICE QUESTIONS WHICH STUDENTS ANSWERED CORRECTLY

FORMULA:  7/3

                                MEAN      SIGMA          RANGE           N
ID = 00007      MATH             .84        .15       .50 -  1.00       39
                ENGLISH          .85        .19       .20 -  1.00       59

OPINION QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW/NO RESPONSE

FORMULA:  8/4

                                MEAN      SIGMA          RANGE           N
ID = 00008      MATH             .03        .11      0.00 -   .50       21
                ENGLISH          .06        .12      0.00 -   .67       64

RESPONSE OPP GIVEN TO STUDENTS PRESELECTED IN PATTERNED TURNS

FORMULA:  9/1+2+3+4

                                MEAN      SIGMA          RANGE           N
ID = 00009      MATH             .02        .07      0.00 -   .29       56
                ENGLISH          .08        .13      0.00 -   .39       78

RESPONSE OPP GIVEN TO STUDENTS PRESELECTED IN NON-PATTERNED TURNS

FORMULA:  10/1+2+3+4

                                MEAN      SIGMA          RANGE           N
ID = 00010      MATH             .03        .04      0.00 -   .18       56
                ENGLISH          .04        .07      0.00 -   .33       78

RESPONSE OPPORTUNITIES GIVEN TO NON-VOLUNTEERS

FORMULA:  11/1+2+3+4

                                MEAN      SIGMA          RANGE           N
ID = 00011      MATH             .45        .21       .06 -   .88       56
                ENGLISH          .42        .20       .02 -   .93       78
```

Table 3.2 (cont.)

```
RESPONSE OPPORTUNITIES GIVEN TO VOLUNTEERS

FORMULA:  12/1+2+3+4

                                  MEAN      SIGMA          RANGE          N
ID = 00012     MATH                .22        .13       .02 -   .59      56
               ENGLISH             .25        .18      0.00 -   .72      78

RESPONSE OPPORTUNITIES WHICH STUDENTS ANSWERED BY CALLING OUT

FORMULA:  13/1+2+3+4

                                  MEAN      SIGMA          RANGE          N
ID = 00013     MATH                .28        .20       .01 -   .75      56
               ENGLISH             .21        .16       .01 -   .72      78

PRESELECTED, PATTERNED TURN STUDENTS WHO ANSWERED CORRECTLY

FORMULA:  14/9

                                  MEAN      SIGMA          RANGE          N
ID = 00014     MATH                .75        .24       .15 -  1.00      10
               ENGLISH             .81        .15       .43 -  1.00      39

PRESELECTED, NON-PATTERNED TURN STUDENTS WHO ANSWERED CORRECTLY

FORMULA:  15/10

                                  MEAN      SIGMA          RANGE          N
ID = 00015     MATH                .74        .22      0.00 -  1.00      40
               ENGLISH             .78        .27      0.00 -  1.00      53

NON-VOLUNTEERS WHO ANSWERED CORRECTLY

FORMULA:  16/11

                                  MEAN      SIGMA          RANGE          N
ID = 00016     MATH                .74        .12       .36 -  1.00      56
               ENGLISH             .72        .13      0.00 -  1.00      78

VOLUNTEERS WHO ANSWERED CORRECTLY

FORMULA:  17/12

                                  MEAN      SIGMA          RANGE          N
ID = 00017     MATH                .83        .15      0.00 -  1.00      56
               ENGLISH             .84        .12       .44 -  1.00      77
```

Table 3.2 (cont.)

```
CALL-OUT STUDENTS WHO ANSWERED CORRECTLY

FORMULA:  18/13

                              MEAN      SIGMA          RANGE           N
ID = 00018     MATH            .83        .12       .41 -  1.00       56
               ENGLISH         .80        .14       .37 -  1.00       78

CORRECT ANSWERS

FORMULA:  19/19+20+21+22

                              MEAN      SIGMA          RANGE           N
ID = 00019     MATH            .77        .08       .59 -   .92       56
               ENGLISH         .82        .07       .61 -   .96       78

INCORRECT ANSWERS

FORMULA:  20/19+20+21+22

                              MEAN      SIGMA          RANGE           N
ID = 00020     MATH            .16        .06       .05 -   .36       56
               ENGLISH         .12        .06      0.00 -   .34       78

ANSWERS WHICH WERE DONT KNOW

FORMULA:  21/19+20+21+22

                              MEAN      SIGMA          RANGE           N
ID = 00021     MATH            .03        .03      0.00 -   .18       56
               ENGLISH         .03        .03      0.00 -   .17       78

ANSWERS WHICH WERE NO RESPONSE

FORMULA:  22/19+20+21+22

                              MEAN      SIGMA          RANGE           N
ID = 00022     MATH            .04        .04      0.00 -   .16       56
               ENGLISH         .03        .02      0.00 -   .13       78

CORRECT ANSWERS WHICH TEACHER PRAISED

FORMULA:  23/19

                              MEAN      SIGMA          RANGE           N
ID = 00023     MATH            .12        .10      0.00 -   .40       56
               ENGLISH         .13        .11      0.00 -   .54       78
```

Table 3.2 (cont.)

```
CORRECT ANSWERS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  24/19

                                MEAN       SIGMA           RANGE            N
ID = 09024     MATH              .07         .07       0.00 -    .30       56
               ENGLISH           .07         .07       0.00 -    .36       78

CORRECT ANSWERS AFTER WHICH TEACHER ASKED A NON-ACADEMIC QUESTION

FORMULA:  25/19

                                MEAN       SIGMA           RANGE            N
ID = 09025     MATH              .00         .02       0.00 -    .14       56
               ENGLISH           .00         .01       0.00 -    .05       78

CORRECT ANSWERS WHICH TEACHER INTEGRATED INTO THE CLASS DISCUSSION

FORMULA:  26/19

                                MEAN       SIGMA           RANGE            N
ID = 09026     MATH              .16         .18       0.00 -    .71       56
               ENGLISH           .11         .14       0.00 -    .67       78

CORRECT ANSWERS AFTER WHICH TEACHER GAVE NO FEEDBACK

FORMULA:  27/19

                                MEAN       SIGMA           RANGE            N
ID = 09027     MATH              .01         .03       0.00 -    .20       56
               ENGLISH           .02         .06       0.00 -    .36       78

CORRECT ANSWERS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

FORMULA:  28/19

                                MEAN       SIGMA           RANGE            N
ID = 09028     MATH              .04         .05       0.00 -    .25       56
               ENGLISH           .04         .06       0.00 -    .37       78

INCORRECT ANSWERS WHICH TEACHER CRITICIZED

FORMULA:  30/20

                                MEAN       SIGMA           RANGE            N
ID = 09030     MATH              .02         .03       0.00 -    .14       56
               ENGLISH           .02         .05       0.00 -    .33       77
```

Table 3.2 (cont.)

```
INCORRECT ANSWERS AFTER WHICH TEACHER REPEATED THE QUESTION

FORMULA:  31/20

                                 MEAN      SIGMA          RANGE           N
ID = 09031      MATH              .11        .10      0.00 -  1.00       56
                ENGLISH           .08        .08      0.00 -   .27       77

INCORRECT ANSWERS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

FORMULA:  32/20

                                 MEAN      SIGMA          RANGE           N
ID = 09032      MATH              .12        .11      0.00 -   .50       56
                ENGLISH           .11        .09      0.00 -   .43       77

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  33/20

                                 MEAN      SIGMA          RANGE           N
ID = 09033      MATH              .05        .07      0.00 -   .30       56
                ENGLISH           .05        .06      0.00 -   .33       77

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED A NON-ACADEMIC QUESTION

FORMULA:  34/20

                                 MEAN      SIGMA          RANGE           N
ID = 09034      MATH              .02        .03      0.00 -   .16       56
                ENGLISH           .03        .11      0.00 -  1.00       77

INCORRECT ANSWERS WHICH TEACHER INTEGRATED INTO CLASS DISCUSSION

FORMULA:  35/20

                                 MEAN      SIGMA          RANGE           N
ID = 09035      MATH              .02        .04      0.00 -   .20       56
                ENGLISH           .02        .05      0.00 -   .33       77

INCORRECT ANSWERS AFTER WHICH TEACHER GAVE NO FEEDBACK

FORMULA:  36/20

                                 MEAN      SIGMA          RANGE           N
ID = 09036      MATH              .01        .06      0.00 -   .39       56
                ENGLISH           .02        .05      0.00 -   .25       77
```

Table 3.2 (cont.)

```
INCORRECT ANSWERS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

FORMULA:  37/20

                                  MEAN       SIGMA         RANGE            N
ID = 09037      MATH               .11         .11     0.00 -   .50        56
                ENGLISH            .11         .16     0.00 -  1.00        77

INCORRECT ANSWERS AFTER WHICH TEACHER GAVE THE ANSWER

FORMULA:  38/20

                                  MEAN       SIGMA         RANGE            N
ID = 09038      MATH               .19         .14     0.00 -   .67        56
                ENGLISH            .18         .13     0.00 -   .50        77

INCORRECT ANSWERS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

FORMULA:  39/20

                                  MEAN       SIGMA         RANGE            N
ID = 09039      MATH               .25         .18     0.00 -  1.00        56
                ENGLISH            .22         .20     0.00 -  1.00        77

INCORRECT ANSWERS AFTER WHICH ANOTHER STUDENT CALLED OUT AN ANSWER

FORMULA:  40/20

                                  MEAN       SIGMA         RANGE            N
ID = 09040      MATH               .05         .06     0.00 -   .23        56
                ENGLISH            .08         .10     0.00 -  1.00        77

DONT KNOW AND NO RESPONSE ANSWERS WHICH TEACHER CRITICIZED

FORMULA:  41/21+22

                                  MEAN       SIGMA         RANGE            N
ID = 09041      MATH               .03         .05     0.00 -   .25        53
                ENGLISH            .03         .05     0.00 -   .25        76

DONT KNOW/NO RESPONSE ANSWERS WHICH TEACHER REPEATED QUESTION

FORMULA:  42/21+22

                                  MEAN       SIGMA         RANGE            N
ID = 09042      MATH               .08         .09     0.00 -   .40        53
                ENGLISH            .08         .10     0.00 -   .50        76
```

Table 3.2 (cont.)

```
DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER SIMPLIFIED QUESTION

FORMULA:  43/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09043    MATH               .10        .12    0.00 -   .50     53
              ENGLISH            .09        .13    0.00 -   .50     76

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER ASKED NEW QUESTION

FORMULA:  44/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09044    MATH               .04        .08    0.00 -   .41     53
              ENGLISH            .02        .05    0.00 -   .33     76

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH T. ASKED NON-ACADEMIC
QUESTION
FORMULA:  45/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09045    MATH               .02        .04    0.00 -   .13     53
              ENGLISH            .03        .05    0.00 -   .20     76

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER GAVE PROCESS
FEEDBACK
FORMULA:  46/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09046    MATH               .04        .05    0.00 -   .23     53
              ENGLISH            .03        .07    0.00 -   .50     76

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER GAVE THE ANSWER

FORMULA:  47/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09047    MATH               .09        .09    0.00 -   .36     53
              ENGLISH            .09        .11    0.00 -   .44     76

DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH TEACHER ASKED OTHER STUDENT

FORMULA:  48/21+22

                                MEAN      SIGMA        RANGE         N
ID = 09048    MATH               .47        .22     .11 -  1.00     53
              ENGLISH            .45        .26    0.00 -  1.00     76
```

Table 3.2 (cont.)

```
DONT KNOW/NO RESPONSE ANSWERS AFTER WHICH OTHER S. CALLED OUT ANSWER

FORMULA:  49/21+22

                                MEAN      SIGMA          RANGE           N
ID = 00049     MATH              .09        .13     0.00 -    .67       53
               ENGLISH           .09        .12     0.00 -    .67       76

PROCESS QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

FORMULA:  50/1

                                MEAN      SIGMA          RANGE           N
ID = 00050     MATH              .18        .12     0.00 -    .50       54
               ENGLISH           .12        .15     0.00 -   1.00       78

PRODUCT QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

FORMULA:  51/2

                                MEAN      SIGMA          RANGE           N
ID = 00051     MATH              .15        .06      .05 -    .33       56
               ENGLISH           .12        .06     0.00 -    .39       78

CHOICE QUESTIONS WHICH STUDENTS ANSWERED INCORRECTLY

FORMULA:  52/3

                                MEAN      SIGMA          RANGE           N
ID = 00052     MATH              .15        .15     0.00 -    .50       39
               ENGLISH           .11        .15     0.00 -    .60       59

PROCESS QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW

FORMULA:  53/1

                                MEAN      SIGMA          RANGE           N
ID = 00053     MATH              .04        .05     0.00 -    .20       54
               ENGLISH           .04        .12     0.00 -   1.00       78

PRODUCT QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW

FORMULA:  54/2

                                MEAN      SIGMA          RANGE           N
ID = 00054     MATH              .03        .03     0.00 -    .18       56
               ENGLISH           .03        .03     0.00 -    .14       78
```

Table 3.2 (cont.)

```
CHOICE QUESTIONS WHICH STUDENTS ANSWERED WITH DONT KNOW

FORMULA:  55/3

                                  MEAN      SIGMA          RANGE          N
ID = 00055      MATH               .00        .01      0.00 -   .04      39
                ENGLISH            .02        .07      0.00 -   .40      59

PROCESS QUESTIONS TO WHICH STUDENTS GAVE NO RESPONSE

FORMULA:  56/1

                                  MEAN      SIGMA          RANGE          N
ID = 00056      MATH               .04        .07      0.00 -   .25      54
                ENGLISH            .03        .05      0.00 -   .33      78

PRODUCT QUESTIONS TO WHICH STUDENTS GAVE NO RESPONSE

FORMULA:  57/2

                                  MEAN      SIGMA          RANGE          N
ID = 00057      MATH               .04        .04      0.00 -   .16      56
                ENGLISH            .03        .03      0.00 -   .14      78

CHOICE QUESTIONS TO WHICH STUDENTS GAVE NO RESPONSE

FORMULA:  58/3

                                  MEAN      SIGMA          RANGE          N
ID = 00058      MATH               .01        .04      0.00 -   .17      39
                ENGLISH            .02        .06      0.00 -   .25      59

PRESELECTED PATTERNED TURN STUDENTS WHO WERE ASKED PRODUCT QUESTION

FORMULA: 60/2

                                  MEAN      SIGMA          RANGE          N
ID = 00060      MATH               .02        .06      0.00 -   .33      56
                ENGLISH            .09        .14      0.00 -   .46      78

PRESELECTED NON-PATTERN TURN STUDENTS WHO WERE ASKED PROCESS QUESTION

FORMULA: 63/1

                                  MEAN      SIGMA          RANGE          N
ID = 00063      MATH               .04        .08      0.00 -   .50      54
                ENGLISH            .03        .09      0.00 -   .57      78
```

Table 3.2 (cont.)

```
PRESELECTED NON-PATTERN TURN STUDENTS WHO WERE ASKED PRODUCT QUESTION

FORMULA:  64/2

                              MEAN      SIGMA          RANGE          N
ID = 00064     MATH            .03        .04      0.00 -   .20      56
               ENGLISH         .04        .07      0.00 -   .36      78

PRESELECTED NON-PATTERN TURN STUDENTS WHO WERE ASKED CHOICE QUESTION

FORMULA:  65/3

                              MEAN      SIGMA          RANGE          N
ID = 00065     MATH            .04        .09      0.00 -   .38      39
               ENGLISH         .05        .16      0.00 -  1.00      59

PROCESS QUESTIONS DIRECTED TO NON-VOLUNTEERS

FORMULA: 67/1

                              MEAN      SIGMA          RANGE          N
ID = 00067     MATH            .41        .25      0.00 -  1.00      54
               ENGLISH         .43        .30      0.00 -  1.00      78

PRODUCT QUESTIONS DIRECTED TO NON-VOLUNTEERS

FORMULA:  68/2

                              MEAN      SIGMA          RANGE          N
ID = 00068     MATH            .47        .21       .09 -   .88      56
               ENGLISH         .42        .21      0.00 -   .92      78

CHOICE  QUESTIONS DIRECTED TO NON-VOLUNTEERS

FORMULA:  69/3

                              MEAN      SIGMA          RANGE          N
ID = 00069     MATH            .44        .35      0.00 -  1.00      39
               ENGLISH         .50        .37      0.00 -  1.00      59

OPINION QUESTIONS DIRECTED TO NON-VOLUNTEERS

FORMULA:  70/4

                              MEAN      SIGMA          RANGE          N
ID = 00070     MATH            .32        .41      0.00 -  1.00      21
               ENGLISH         .26        .28      0.00 -  1.00      64
```

Table 3.2 (cont.)

```
PROCESS QUESTIONS DIRECTED TO VOLUNTEERS

FORMULA:  71/1

                                MEAN      SIGMA          RANGE          N
ID = 00071     MATH              .34        .23      0.00 -  1.00      58
               ENGLISH           .32        .26      0.00 -  1.00      78

PRODUCT QUESTIONS DIRECTED TO VOLUNTEERS

FORMULA:  72/2

                                MEAN      SIGMA          RANGE          N
ID = 00072     MATH              .19        .13      0.00 -   .59      56
               ENGLISH           .25        .18      0.00 -   .74      78

CHOICE QUESTIONS DIRECTED TO VOLUNTEERS

FORMULA:  73/3

                                MEAN      SIGMA          RANGE          N
ID = 00073     MATH              .17        .29      0.00 -  1.00      39
               ENGLISH           .14        .25      0.00 -  1.00      59

OPINION QUESTIONS DIRECTED TO VOLUNTEERS

FORMULA:  74/4

                                MEAN      SIGMA          RANGE          N
ID = 00074     MATH              .22        .36      0.00 -  1.00      21
               ENGLISH           .27        .31      0.00 -  1.00      64

PROCESS QUESTIONS ANSWERED BY A STUDENT CALLING OUT

FORMULA:  75/1

                                MEAN      SIGMA          RANGE          N
ID = 00075     MATH              .20        .17      0.00 -   .60      58
               ENGLISH           .18        .22      0.00 -  1.00      78

PRODUCT QUESTIONS ANSWERED BY A STUDENT CALLING OUT

FORMULA:  76/2

                                MEAN      SIGMA          RANGE          N
ID = 00076     MATH              .24        .22       .01 -   .82      56
               ENGLISH           .21        .18       .01 -   .92      78
```

Table 3.2 (cont.)

```
CHOICE QUESTIONS ANSWERED BY A STUDENT CALLING OUT

FORMULA:  77/3
                               MEAN      SIGMA         RANGE            N
 ID = 00077      MATH           .35        .35     0.00 -  1.00         39
                 ENGLISH        .23        .33     0.00 -  1.00         59

OPINION QUESTIONS ANSWERED BY A STUDENT CALLING OUT

FORMULA:  78/4
                               MEAN      SIGMA         RANGE            N
 ID = 00078      MATH           .38        .46     0.00 -  1.00         21
                 ENGLISH        .41        .36     0.00 -  1.00         64

ANSWERS TO PROCESS QUESTIONS WHICH TEACHER PRAISED

FORMULA:  79/1
                               MEAN      SIGMA         RANGE            N
 ID = 00079      MATH           .15        .15     0.00 -   .50         54
                 ENGLISH        .16        .18     0.00 -  1.00         78

ANSWERS TO PRODUCT QUESTIONS WHICH TEACHER PRAISED

FORMULA:  80/2
                               MEAN      SIGMA         RANGE            N
 ID = 00080      MATH           .09        .08     0.00 -   .33         56
                 ENGLISH        .10        .09     0.00 -   .42         78

ANSWERS TO CHOICE  QUESTIONS WHICH TEACHER PRAISED

FORMULA:  81/3
                               MEAN      SIGMA         RANGE            N
 ID = 00081      MATH           .04        .10     0.00 -   .50         39
                 ENGLISH        .10        .20     0.00 -  1.00         59

ANSWERS TO OPINION QUESTIONS WHICH TEACHER PRAISED

FOMRULA:  82/4
                               MEAN      SIGMA         RANGE            N
 ID = 00082      MATH           .11        .25     0.00 -  1.00         21
                 ENGLISH        .13        .22     0.00 -  1.00         64
```

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Table 3.2 (cont.)

```
ANSWERS TO PROCESS QUESTIONS WHICH TEACHER CRITICIZED

FORMULA:  83/1

                                 MEAN      SIGMA         RANGE          N
 ID = 09083     MATH              .00        .01      0.00 -   .08      54
                ENGLISH           .00        .01      0.00 -   .07      78

ANSWERS TO PRODUCT QUESTIONS WHICH TEACHER CRITICIZED

FORMULA:  84/2

                                 MEAN      SIGMA         RANGE          N
 ID = 09084     MATH              .01        .01      0.00 -   .03      56
                ENGLISH           .00        .01      0.00 -   .05      78

PROCESS QUESTIONS AFTER WHICH TEACHER REPEATED THE QUESTION

FORMULA:  87/1

                                 MEAN      SIGMA         RANGE          N
 ID = 09087     MATH              .02        .04      0.00 -   .20      54
                ENGLISH           .01        .03      0.00 -   .22      78

PRODUCT QUESTIONS AFTER WHICH TEACHER REPEATED THE QUESTION

FORMULA:  88/2

                                 MEAN      SIGMA         RANGE          N
 ID = 09088     MATH              .02        .02      0.00 -   .11      56
                ENGLISH           .02        .01      0.00 -   .07      78

CHOICE QUESTIONS AFTER WHICH TEACHER REPEATED THE QUESTION

FORMULA:  89/3

                                 MEAN      SIGMA         RANGE          N
 ID = 09089     MATH              .01        .03      0.00 -   .17      39
                ENGLISH           .01        .03      0.00 -   .15      59

PROCESS QUESTIONS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

FORMULA:  91/1

                                 MEAN      SIGMA         RANGE          N
 ID = 09091     MATH              .03        .04      0.00 -   .20      54
                ENGLISH           .01        .03      0.00 -   .14      78
```

Table 3.2 (cont.)

```
PRODUCT QUESTIONS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

FORMULA:  92/2

                                MEAN      SIGMA          RANGE            N
ID = 00092     MATH              .02        .02      0.00 -   .10        56
               ENGLISH           .02        .02      0.00 -   .09        78

CHOICE  QUESTIONS AFTER WHICH TEACHER SIMPLIFIED THE QUESTION

FORMULA:  93/3

                                MEAN      SIGMA          RANGE            N
ID = 00093     MATH              .02        .04      0.00 -   .20        39
               ENGLISH           .02        .06      0.00 -   .25        59

PROCESS QUESTIONS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  95/1

                                MEAN      SIGMA          RANGE            N
ID = 00095     MATH              .08        .10      0.00 -   .45        50
               ENGLISH           .07        .14      0.00 -  1.00        78

PRODUCT QUESTIONS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  96/2

                                MEAN      SIGMA          RANGE            N
ID = 00096     MATH              .06        .05      0.00 -   .21        56
               ENGLISH           .06        .05      0.00 -   .25        78

CHOICE  QUESTIONS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  97/3

                                MEAN      SIGMA          RANGE            N
ID = 00097     MATH              .08        .15      0.00 -   .56        39
               ENGLISH           .07        .18      0.00 -   .95        59

OPINION QUESTIONS AFTER WHICH TEACHER ASKED A NEW QUESTION

FORMULA:  98/4

                                MEAN      SIGMA          RANGE            N
ID = 00098     MATH              .01        .04      0.00 -   .14        21
               ENGLISH           .06        .09      0.00 -   .36        60
```

Table 3.2 (cont.)

```
PROCESS QUESTIONS AFTER WHICH TEACHER ASKED NON-ACADEMIC QUESTION

FORMULA:  99/1

                                 MEAN      SIGMA          RANGE         N
ID = 09099     MATH               .01        .02     0.00 -   .09      53
               ENGLISH            .01        .04     0.00 -   .33      78

PRODUCT QUESTIONS AFTER WHICH TEACHER ASKED NON-ACADEMIC QUESTION

FORMULA:  100/2

                                 MEAN      SIGMA          RANGE         N
ID = 09100     MATH               .01        .02     0.00 -   .11      56
               ENGLISH            .01        .01     0.00 -   .[illegible]      78

ANSWERS TO PROCESS QUESTIONS WHICH TEACHER INTEGRATED INTO DISCUSSION

FORMULA:  103/1

                                 MEAN      SIGMA          RANGE         N
ID = 09103     MATH               .15        .18     0.00 -   .71      58
               ENGLISH            .15        .20     0.00 -  1.00      78

ANSWERS TO PRODUCT QUESTIONS WHICH TEACHER INTEGRATED INTO DISCUSSION

FORMULA:  104/2

                                 MEAN      SIGMA          RANGE         N
ID = 09104     MATH               .13        .14     0.00 -   .51      56
               ENGLISH            .08        .12     0.00 -   .60      78

ANSWERS TO CHOICE QUESTIONS WHICH TEACHER INTEGRATED INTO DISCUSSION

FORMULA:  105/3

                                 MEAN      SIGMA          RANGE         N
ID = 09105     MATH               .19        .29     0.00 -  1.00      39
               ENGLISH            .13        .25     0.00 -  1.00      59

ANSWERS TO OPINION QUESTIONS WHICH TEACHER INTEGRATED INTO DISCUSSION

FORMULA:  106/4

                                 MEAN      SIGMA          RANGE         N
ID = 09106     MATH               .08        .22     0.00 -  1.00      21
               ENGLISH            .05        .19     0.00 -  1.00      64
```

Table 3.2 (cont.)

```
PROCESS QUESTIONS AFTER WHICH TEACHER GAVE NO FEEDBACK

 FORMULA: 107/1

                                MEAN      SIGMA          RANGE          N
ID = 09107     MATH              .01        .03     0.00 -    .19      54
               ENGLISH           .02        .06     0.00 -    .46      78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE NO FEEDBACK

 FORMULA:  108/2

                                MEAN      SIGMA          RANGE          N
ID = 09108     MATH              .01        .03     0.00 -    .19      56
               ENGLISH           .02        .05     0.00 -    .26      78

PROCESS QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

 FOMRULA:  109/3

                                MEAN      SIGMA          RANGE          N
ID = 09111     MATH              .09        .10     0.00 -    .40      54
               ENGLISH           .10        .17     0.00 -   1.00      78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

 FORMULA:  112/2

                                MEAN      SIGMA          RANGE          N
ID = 09112     MATH              .04        .05     0.00 -    .20      56
               ENGLISH           .04        .08     0.00 -    .22      78

CHOICE QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

 FORMULA:  113/3

                                MEAN      SIGMA          RANGE          N
ID = 09113     MATH              .07        .10     0.00 -   1.00      39
               ENGLISH           .04        .14     0.00 -   1.00      59

OPINION QUESTIONS AFTER WHICH TEACHER GAVE PROCESS FEEDBACK

 FORMULA:  114/4

                                MEAN      SIGMA          RANGE          N
ID = 09114     MATH              .24        .12     0.00 -    .50      21
               ENGLISH           .04        .10     0.00 -    .46      64
```

Table 3.2 (cont.)

```
PROCESS QUESTIONS AFTER WHICH TEACHER GAVE THE ANSWER

 FORMULA: 115/1

                            MEAN      SIGMA         RANGE           N
ID = 09115     MATH          .04        .08      0.00 -  .50        54
               ENGLISH       .02        .05      0.00 -  .25        78

PRODUCT QUESTIONS AFTER WHICH TEACHER GAVE THE ANSWER

 FORMULA: 116/2

                            MEAN      SIGMA         RANGE           N
ID = 09116     MATH          .03        .03      0.00 -  .10        56
               ENGLISH       .03        .02      0.00 -  .10        78

CHOICE  QUESTIONS AFTER WHICH TEACHER GAVE THE ANSWER

 FORMULA: 117/3

                            MEAN      SIGMA         RANGE           N
ID = 09117     MATH          .04        .08      0.00 -  .25        39
               ENGLISH       .04        .10      0.00 -  .50        59

PROCESS QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

 FORMULA: 119/1

                            MEAN      SIGMA         RANGE           N
ID = 09119     MATH          .09        .10      0.00 -  .43        54
               ENGLISH       .07        .09      0.00 -  .50        78

PRODUCT QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

 FORMULA: 120/2

                            MEAN      SIGMA         RANGE           N
ID = 09120     MATH          .08        .06      0.00 -  .29        56
               ENGLISH       .06        .04      0.00 -  .16        78

CHOICE QUESTIONS AFTER WHICH TEACHER ASKED ANOTHER STUDENT

 FORMULA: 121/3

                            MEAN      SIGMA         RANGE           N
ID = 09121     MATH          .06        .18      0.00 - 1.00        39
               ENGLISH       .04        .10      0.00 -  .50        59
```

Table 3.2 (cont.)

```
PROCESS QUESTIONS AFTER WHICH ANOTHER STUDENT CALLED OUT ANSWER

 FORMULA:  123/1

                              MEAN      SIGMA          RANGE           N
ID = 09123     MATH            .01        .02     0.00 -   .11        54
               ENGLISH         .01        .01     0.00 -   .06        78

PRODUCT QUESTIONS AFTER WHICH ANOTHER STUDENT CALLED OUT ANSWER

  FORMULA:  124/2

                              MEAN      SIGMA          RANGE           N
ID = 09124     MATH            .02  [illegible]   0.00 -   .12        56
               ENGLISH         .01        .02     0.00 -   .11        78

CHOICE QUESTIONS AFTER WHICH ANOTHER STUDENT CALLED OUT ANSWER

  FORMULA:  125/3

                              MEAN      SIGMA          RANGE           N
ID = 09125     MATH            .01        .03     0.00 -   .20        39
               ENGLISH         .02        .05     0.00 -   .25        59

PRESELECTED PATTERNED TURN STUDENTS WHO ANSWERED INCORRECTLY

  FORMULA:  127/9

                              MEAN      SIGMA          RANGE           N
ID = 09127     MATH            .13  [illegible]   0.00 -   .42        10
               ENGLISH         .15        .15     0.00 -   .57        39

PRESELECTED NON-PATTERNED TURN STUDENTS WHO ANSWERED INCORRECTLY

  FORMULA:  128/10

                              MEAN      SIGMA          RANGE           N
ID = 09128     MATH            .15        .19     0.00 -  1.00        40
               ENGLISH         .10        .16     0.00 -  1.00        53

NON-VOLUNTEERS WHO ANSWERED INCORRECTLY

  FORMULA:  129/11

                              MEAN      SIGMA          RANGE           N
ID = 09129     MATH            .15        .07     0.00 -   .29        56
               ENGLISH         .12        .07     0.00 -   .33        78
```

Table 3.2 (cont.)

```
VOLUNTEERS WHO ANSWERED INCORRECTLY

 FORMULA:  130/12

                              MEAN      SIGMA          RANGE          N
ID = 09130    MATH             .16        .15       0.00 -  1.00     56
              ENGLISH          .09        .07       0.00 -   .33     77

CALL-OUT STUDENTS WHO ANSWERED INCORRECTLY

 FORMULA:  131/13

                              MEAN      SIGMA          RANGE          N
ID = 09131    MATH             .15        .10       0.00 -   .55     56
              ENGLISH          .11        .10       0.00 -   .50     78

PRESELECTED PATTERNED TURN STUDENTS WHO ANSWERED - DONT KNOW

FORMULA:  132/9

                              MEAN      SIGMA          RANGE          N
ID = 09132    MATH             .02        .02       0.00 -   .07     10
              ENGLISH          .02        .04       0.00 -   .19     39

PRESELECTED NON-PATTERNED TURN STUDENTS WHO ANSWERED - DONT KNOW

FORMULA:  133/10

                              MEAN      SIGMA          RANGE          N
ID = 09133    MATH             .06        .09       0.00 -   .33     40
              ENGLISH          .04        .09       0.00 -   .50     53

NON-VOLUNTEERS WHO ANSWERED - DONT KNOW

 FORMULA:  134/11

                              MEAN      SIGMA          RANGE          N
ID = 09134    MATH             .07        .07       0.00 -   .33     56
              ENGLISH          .06        .07       0.00 -   .33     78

VOLUNTEERS WHO ANSWERED - DONT KNOW

FORMULA:  135/12

                              MEAN      SIGMA          RANGE          N
ID = 09135    MATH             .00        .01       0.00 -   .07     56
              ENGLISH          .00        .02       0.00 -   .13     77
```

Table 3.2 (cont.)

```
PRESELECTED PATTERNED TURN STUDENTS WHO GAVE NO RESPONSE

FORMULA:  137/9

                                 MEAN       SIGMA         RANGE           N
ID = 09137     MATH               .01         .02     0.00 -   .08       10
               ENGLISH            .02         .03     0.00 -   .11       39

PRESELECTED NON-PATTERNED TURN STUDENTS WHO GAVE NO RESPONSE

FORMULA:  138/10

                                 MEAN       SIGMA         RANGE           N
ID = 09138     MATH               .04         .08     0.00 -   .33       40
               ENGLISH            .05         .16     0.00 -  1.00       53

NON-VOLUNTEERS WHO GAVE NO RESPONSE

FORMULA:  139/11

                                 MEAN       SIGMA         RANGE           N
ID = 09139     MATH               .07         .07     0.00 -   .29       56
               ENGLISH            .07         .07     0.00 -   .50       78

PRESELECTED PATTERNED TURN STUDENTS WHOM TEACHER PRAISED

FORMULA:  140/9

                                 MEAN       SIGMA         RANGE           N
ID = 09140     MATH               .17         .30     0.00 -  1.00       10
               ENGLISH            .12         .17     0.00 -   .67       39

PRESELECTED NON-PATTERNED TURN STUDENTS WHOM TEACHER PRAISED

FORMULA:  141/10

                                 MEAN       SIGMA         RANGE           N
ID = 09141     MATH               .16         .20     0.00 -  1.00       40
               ENGLISH            .13         .20     0.00 -  1.00       53

NON-VOLUNTEERS WHOM TEACHER PRAISED

FORMULA:  142/11

                                 MEAN       SIGMA         RANGE           N
ID = 09142     MATH               .08         .08     0.00 -   .33       56
               ENGLISH            .05         .09     0.00 -   .43       78
```

Table 3.2 (cont.)

```
VOLUNTEERS WHOM TEACHER PRAISED

FORMULA:  143/12

                                MEAN      SIGMA          RANGE           N
ID = 09143     MATH              .11        .12      0.00 -    .53      56
               ENGLISH           .13        .13      0.00 -    .67      77

CALL-OUT STUDENTS WHOM TEACHER PRAISED

FORMULA:  144/13

                                MEAN      SIGMA          RANGE           N
ID = 09144     MATH              .09        .09      0.00 -    .37      56
               ENGLISH           .11        .10      0.00 -    .68      78

NON-VOLUNTEERS WHOM TEACHER CRITICIZED

FORMULA:  147/11

                                MEAN      SIGMA          RANGE           N
ID = 09147     MATH              .01        .01      0.00 -    .04      56
               ENGLISH           .01        .01      0.00 -    .05      78

CALL-OUT STUDENTS WHOM TEACHER CRITICIZED

FORMULA:  148/12

                                MEAN      SIGMA          RANGE           N
ID = 09149     MATH              .01        .01      0.00 -    .06      56
               ENGLISH           .01        .02      0.00 -    .20      78

PRESELECTED PATTERNED TURN STUDENTS FOR WHOM TEACHER REPEATED QUESTION

FORMULA:  150/9

                                MEAN      SIGMA          RANGE           N
ID = 09150     MATH              .01        .03      0.00 -    .09      18
               ENGLISH           .01        .03      0.00 -    .11      39

PRESELECT NON-PATTERNED TURN STUDENTS FOR WHOM TEACHER REPEATED
QUESTION
 FORMULA:  151/10

                                MEAN      SIGMA          RANGE           N
ID = 09151     MATH              .02        .04      0.00 -    .18      40
               ENGLISH           .01        .04      0.00 -    .22      53
```

Table 3.2 (cont.)

```
NON-VOLUNTEERS FOR WHOM TEACHER REPEATED THE QUESTION

 FORMULA:  152/11

                                 MEAN      SIGMA          RANGE           N
ID = 09152     MATH               .03        .02      0.00 -    .10      56
               ENGLISH            .02        .02      0.00 -    .07      78

VOLUNTEERS FOR WHOM TEACHER REPEATED THE QUESTION

 FORMULA:  153/12

                                 MEAN      SIGMA          RANGE           N
ID = 09153     MATH               .02        .07      0.00 -    .50      56
               ENGLISH            .01        .01      0.00 -    .06      77

CALL-OUT STUDENTS FOR WHOM TEACHER REPEATED THE QUESTION

 FORMULA:  154/13

                                 MEAN      SIGMA          RANGE           N
ID = 09154     MATH               .02        .05      0.00 -    .33      56
               ENGLISH            .01        .02      0.00 -    .10      78

PRESELECT PATTERNED TURN STUDENTS FOR WHOM TEACHER SIMPLIFIED QUESTION

 FORMULA:  155/9

                                 MEAN      SIGMA          RANGE           N
ID = 09155     MATH               .00        .01      0.00 -    .02      10
               ENGLISH            .01        .02      0.00 -    .11      39

PRESELECT NON-PATTERN TURN STUDENTS FOR WHOM TEACHER SIMPLIFIED
QUESTION
 FORMULA:  156/10

                                 MEAN      SIGMA          RANGE           N
ID = 09156     MATH               .03        .07      0.00 -    .29      48
               ENGLISH            .04        .08      0.00 -    .50      53

NON-VOLUNTEER FOR WHOM TEACHER SIMPLIFIED THE QUESTION

 FORMULA:  157/11

                                 MEAN      SIGMA          RANGE           N
ID = 09157     MATH               .04        .05      0.00 -    .25      56
               ENGLISH            .03        .02      0.00 -    .09      78
```

Table 3.2 (cont.)

```
VOLUNTEERS FOR WHOM TEACHER SIMPLIFIED THE QUESTION

 FORMULA:  158/12

                              MEAN      SIGMA          RANGE          N
ID = 09158    MATH             .01        .02     0.00 -   .07       56
              ENGLISH          .01        .02     0.00 -   .13       77

CALL-OUT STUDENTS FOR WHOM TEACHER SIMPLIFIED THE QUESTION

 FORMULA:  159/13

                              MEAN      SIGMA          RANGE          N
ID = 09159    MATH             .01        .02     0.00 -   .10       56
              ENGLISH          .01        .01     0.00 -   .06       78

PRESELECTED PATTERNED TURN STUDENTS WHOM TEACHER ASKED NEW QUESTION

 FORMULA:  160/9

                              MEAN      SIGMA          RANGE          N
ID = 09160    MATH             .02        .05     0.00 -   .10       10
              ENGLISH          .04        .08     0.00 -   .38       39

PRESELECT NON-PATTERNED TURN STUDENTS WHOM TEACHER ASKED NEW QUESTION

 FORMULA:  161/10

                              MEAN      SIGMA          RANGE          N
ID = 09161    MATH             .08        .15     0.00 -   .71       40
              ENGLISH          .12        .24     0.00 -  1.00       53

NON-VOLUNTEERS WHOM TEACHER ASKED A NEW QUESTION

 FORMULA:  162/11

                              MEAN      SIGMA          RANGE          N
ID = 09162    MATH             .08        .07     0.00 -   .32       56
              ENGLISH          .08        .07     0.00 -   .31       78

VOLUNTEERS WHOM TEACHER ASKED A NEW QUESTION

 FORMULA: 163/12

                              MEAN      SIGMA          RANGE          N
ID = 09163    MATH             .07        .08     0.00 -   .33       56
              ENGLISH          .06        .06     0.00 -   .25       77
```

202

Table 3.2 (cont.)

```
CALL-OUT STUDENTS WHOM TEACHER ASKED A NEW QUESTION

 FORMULA:  164/13

                               MEAN      SIGMA          RANGE          N
ID = 09164     MATH             .04        .06      0.00 -    .29     56
               ENGLISH          .04        .05      0.00 -    .25     78

PRESELECTED PATTERNED TURN STUDENTS WHOM TEACHER GAVE NON-ACADEMIC
FEEDBACK
 FORMULA:  165/9

                               MEAN      SIGMA          RANGE          N
ID = 09165     MATH             .00        .01      0.00 -    .04     18
               ENGLISH          .01        .02      0.00 -    .13     39

NON-VOLUNTEERS WHOM TEACHER GAVE NON-ACADEMIC FEEDBACK

 FORMULA:  167/11

                               MEAN      SIGMA          RANGE          N
ID = 09167     MATH             .01        .01      0.00 -    .05     56
               ENGLISH          .01        .01      0.00 -    .06     78

VOLUNTEERS WHOM TEACHER GAVE NON-ACADEMIC FEEDBACK

 FORMULA:  168/12

                               MEAN      SIGMA          RANGE          N
ID = 09168     MATH             .01        .03      0.00 -    .20     56
               ENGLISH          .01        .02      0.00 -    .11     77.

CALL-OUT STUDENTS WHOM TEACHER GAVE NON-ACADEMIC FEEDBACK

 FORMULA:  169/13

                               MEAN      SIGMA          RANGE          N
ID = 09169     MATH             .01        .02      0.00 -    .09     56
               ENGLISH          .00        .02      0.00 -    .10     78

PRESELECT PAT TURN STUDENTS WHOSE ANSWERS WERE INTEGRATED INTO
DISCUSSION
 FORMULA:  170/9

                               MEAN      SIGMA          RANGE          N
ID = 09170     MATH             .12        .30      0.00 -   1.00     18
               ENGLISH          .07        .22      0.00 -   1.00     39
```

Table 3.2 (cont.)

```
PRESELECT NON-PAT TURN STUDENTS WHOSE ANSWERS WERE INTEGRATED INTO
DISCUSSION
  FORMULA:  171/10

                                MEAN      SIGMA          RANGE          N
ID = 09171     MATH              .13        .19      0.00 -   .70      48
               ENGLISH           .13        .20      0.00 -  1.00      53

NONVOLUNTEERS WHOSE ANSWERS WERE INTEGRATED INTO CLASS DISCUSSION

  FORMULA:  172/11

                                MEAN      SIGMA          RANGE          N
ID = 09172     MATH              .10        .15      0.00 -   .71      56
               ENGLISH           .09        .15      0.00 -   .67      78

VOLUNTEERS WHOSE ANSWERS WERE INTEGRATED INTO CLASS DISCUSSION

  FORMULA:  173/12

                                MEAN      SIGMA          RANGE          N
ID = 09173     MATH              .14        .18      0.00 -   .77      56
               ENGLISH           .12        .18      0.00 -   .85      77

CALL-OUT STUDENTS WHOSE ANSWERS WERE INTEGRATED INTO DISCUSSION

  FORMULA:  174/13

                                MEAN      SIGMA          RANGE          N
ID = 09174     MATH              .17        .17      0.00 -   .54      56
               ENGLISH           .14        .16      0.00 -   .75      78

NON-VOLUNTEERS WHOM TEACHER GAVE NO FEEDBACK

  FORMULA:  177/11

                                MEAN      SIGMA          RANGE          N
ID = 09177     MATH              .01        .05      0.00 -   .34      56
               ENGLISH           .02        .06      0.00 -   .33      78

VOLUNTEERS WHOM TEACHER GAVE NO FEEDBACK

  FORMULA:  178/12

                                MEAN      SIGMA          RANGE          N
ID = 09178     MATH              .01        .03      0.00 -   .24      56
               ENGLISH           .01        .02      0.00 -   .13      77
```

Table 3.2 (cont.)

```
CALL-OUT STUDENTS WHOM TEACHER GAVE NO FEEDBACK

  FORMULA:  179/13

                              MEAN      SIGMA          RANGE             N
ID = 00179     MATH            .01        .03      0.00 -    .17        56
               ENGLISH         .01        .03      0.00 -    .17        78

PRESELECT PATTERNED TURN STUDENTS WHOM TEACHER GAVE PROCESS FEEDBACK

  FORMULA:  180/[illegible]

                              MEAN      SIGMA          RANGE             N
ID = 00180     MATH            .01        .02      0.00 -    .05        10
               ENGLISH         .03        .09      0.00 -    .57        39

PRESELECT NON-PATTERNED TURN STUDENTS WHOM TEACHER GAVE PROCESS
FEEDBACK
  FORMULA:  181/10

                              MEAN      SIGMA          RANGE             N
ID = 00181     MATH            .05        .11      0.00 -    .50        48
               ENGLISH         .03        .10      0.00 -    .50        53

NON-VOLUNTEERS WHOM TEACHER GAVE PROCESS FEEDBACK

  FORMULA:  182/12

                              MEAN      SIGMA          RANGE             N
ID = 00182     MATH            .05        .06      0.00 -    .21        56
               ENGLISH         .05        .07      0.00 -    .33        78.

VOLUNTEERS WHOM TEACHER GAVE PROCESS FEEDBACK

  FORMULA:  183/12

                              MEAN      SIGMA          RANGE             N
ID = 00183     MATH            .06        .07      0.00 -    .30        56
               ENGLISH         .06        .08      0.00 -    .35        77

CALL-OUT STUDENTS WHOM TEACHER GAVE PROCESS FEEDBACK

  FORMULA:  184/13

                              MEAN      SIGMA          RANGE             N
ID = 00184     MATH            .06        .08      0.00 -    .27        56
               ENGLISH         .05        .06      0.00 -    .21        78
```

Table 3.2 (cont.)

```
PRESELECTED PATTERNED TURN STUDENTS WHOM TEACHER GAVE THE ANSWER

  FORMULA:  185/9

                                 MEAN      SIGMA          RANGE           N
ID = 00185     MATH               .01        .02       0.00 -    .07     10
               ENGLISH            .03        .06       0.00 -    .33     39

PRESELECTED NON-PATTERNED TURN STUDENTS WHOM TEACHER GAVE ANSWER

  FORMULA:  186/10

                                 MEAN      SIGMA          RANGE           N
ID = 00186     MATH               .04        .09       0.00 -    .50     40
               ENGLISH            .03        .10       0.00 -    .50     53

NON-VOLUNTEERS WHOM TEACHER GAVE THE ANSWER

  FORMULA:  187/11

                                 MEAN      SIGMA          RANGE           N
ID = 00187     MATH               .04        .08       0.00 -    .20     56
               ENGLISH            .03        .03       0.00 -    .14     78

VOLUNTEERS WHOM TEACHER GAVE THE ANSWER

  FORMULA:  188/12

                                 MEAN      SIGMA          RANGE           N
ID = 00188     MATH               .03        .07       0.00 -    .50     56
               ENGLISH            .01        .02       0.00 -    .13     77

CALL-OUT STUDENTS WHOM TEACHER GAVE THE ANSWER

  FORMULA:  189/13

                                 MEAN      SIGMA          RANGE           N
ID = 00189     MATH               .03        .03       0.00 -    .14     56
               ENGLISH            .03        .05       0.00 -    .20     78

PRESELECT PATTERNED TURN STUDENTS TERMINATED BY TEACHER ASKING ANOTHER

  FORMULA:  190/9

                                 MEAN      SIGMA          RANGE           N
ID = 00190     MATH               .06        .07       0.00 -    .19     10
               ENGLISH            .04        .08       0.00 -    .33     39
```

Table 3.2 (cont.)

```
PRESELECT NON-PAT TURN STUDENTS TERMINATED BY TEACHER ASKING ANOTHER

   FORMULA:  191/10

                                  MEAN      SIGMA          RANGE          N
ID = 09191     MATH                .10        .13      0.00 -   .50      40
               ENGLISH             .03        .06      0.00 -   .27      53

NON-VOLUNTEERS WHOSE TURNS WERE TERMINATED BY TEACHER ASKING ANOTHER

   FORMULA:  192/11

                                  MEAN      SIGMA          RANGE          N
ID = 09192     MATH                .12        .09      0.00 -   .50      56
               ENGLISH             .09        .06      0.00 -   .29      78

VOLUNTEERS WHOSE TURNS WERE TERMINATED BY TEACHER ASKING ANOTHER

   FORMULA:  193/12

                                  MEAN      SIGMA          RANGE          N
ID = 09193     MATH                .04        .04      0.00 -   .18      56
               ENGLISH             .03        .05      0.00 -   .18      77

CALL-OUTS WHOSE TURNS TERMINATED BY TEACHER ASKING ANOTHER STUDENT

   FORMULA:  194/13

                                  MEAN      SIGMA          RANGE          N
ID = 09194     MATH                .02        .04      0.00 -   .20      56
               ENGLISH             .01        .02      0.00 -   .09      78

NON-VOLUNTEERS WHOSE TURNS TERMINATED BY ANOTHER STUDENT CALL OUT

   FORMULA:  197/11

                                  MEAN      SIGMA          RANGE          N
ID = 09197     MATH                .02        .03      0.00 -   .16      56
               ENGLISH             .02        .04      0.00 -   .33      78

VOLUNTEERS WHOSE TURNS TERMINATED BY ANOTHER STUDENT CALLING OUT

   FORMULA:  198/12

                                  MEAN      SIGMA          RANGE          N
ID = 09198     MATH                .01        .02      0.00 -   .06      56
               ENGLISH             .01        .02      0.00 -   .11      77
```

Table 3.2 (cont.)

```
CALL-OUTS WHOSE TURNS TERMINATED BY ANOTHER STUDENT CALLING OUT

   FORMULA:  19/13

                                MEAN      SIGMA          RANGE           N
ID = 09199      MATH             .02        .03     0.00 -    .28       56
                ENGLISH          .02        .03     0.00 -    .12       78

CORRECT ANSWERS GIVEN BY PRESELECTED PATTERNED TURN STUDENTS

   FORMULA:  14/19

                                MEAN      SIGMA          RANGE           N
ID = 09200      MATH             .02        .06     0.00 -    .26       56
                ENGLISH          .09        .13     0.00 -    .42       78

CORRECT ANSWERS GIVEN BY PRESELECTED NON-PATTERNED TURN STUDENTS

   FORMULA:  15/19

                                MEAN      SIGMA          RANGE           N
ID = 09201      MATH             .03        .04     0.00 -    .18       56
                ENGLISH          .04        .07     0.00 -    .35       78

CORRECT ANSWERS GIVEN BY NON-VOLUNTEERS

   FORMULA:  16/19

                                MEAN      SIGMA          RANGE           N
ID = 09202      MATH             .42        .21      .08 -    .85       56
                ENGLISH          .39        .20     0.00 -    .92       78

CORRECT ANSWERS GIVEN BY VOLUNTEERS

   FORMULA: 17/19

                                MEAN      SIGMA          RANGE           N
ID = 09203      MATH             .23        .14     0.00 -    .61       56
                ENGLISH          .27        .19     0.00 -    .73       78

CORRECT ANSWERS GIVEN BY STUDENTS WHO CALLED OUT

   FORMULA:  18/19

                                MEAN      SIGMA          RANGE           N
ID = 09204      MATH             .30        .22      .01 -    .73       56
                ENGLISH          .21        .16      .01 -    .63       78
```

Table 3.2 (cont.)

```
INCORRECT ANSWERS GIVEN BY PRESELECTED PATTERNED TURN STUDENTS

    FORMULA:  127/20

                                  MEAN      SIGMA          RANGE          N
ID = 09205      MATH               .03        .08     0.00 -   .46       56
                ENGLISH            .08        .13     0.00 -   .52       77

INCORRECT ANSWERS GIVEN BY PRESELECTED NON-PATTERNED TURN STUDENTS

    FORMULA:  128/20

                                  MEAN      SIGMA          RANGE          N
ID = 09206      MATH               .03        .06     0.00 -   .23       56
                ENGLISH            .24        .08     0.00 -   .35       77

INCORRECT ANSWERS GIVEN BY NON-VOLUNTEERS

    FORMULA:  129/20

                                  MEAN      SIGMA          RANGE          N
ID = 09207      MATH               .47        .27     0.00 -  1.00       56
                ENGLISH            .44        .25     0.00 -  1.00       77

INCORRECT ANSWERS GIVEN BY VOLUNTEERS

    FORMULA:  130/20

                                  MEAN      SIGMA          RANGE          N
ID = 09208      MATH               .21        .17     0.00 -   .75       56
                ENGLISH            .22        .22     0.00 -  1.00       77

INCORRECT ANSWERS GIVEN BY STUDENTS WHO CALLED OUT

    FORMULA:  130/20

                                  MEAN      SIGMA          RANGE          N
ID = 09209      MATH               .26        .22     0.00 -  1.00       56
                ENGLISH            .23        .24     0.00 -  1.00       77

DONT KNOW/NO RESPONSE ANSWERS BY PRESELECT PATTERNED TURN STUDENTS

    FORMULA:  132+137/21+22

                                  MEAN      SIGMA          RANGE          N
ID = 09210      MATH               .02        .10     0.00 -   .57       53
                ENGLISH            .06        .12     0.00 -   .53       76
```

Table 3.2 (cont.)

```
DONT KNOW/NO RESPONSE ANSWERS GIVEN BY PRESELECT NON-PAT TURN STUDENTS

    FORMULA:  133+138/21+22

                                 MEAN      SIGMA          RANGE            N
ID = 09211      MATH              .06        .10      0.00 -    .50       53
                ENGLISH           .05        .10      0.00 -    .50       76

DONT KNOW/NO RESPONSE ANSWERS GIVEN BY NON-VOLUNTEERS

    FORMULA:  134+139/21+22

                                 MEAN      SIGMA          RANGE            N
ID = 09212      MATH              .89        .14       .39 -   1.00       53
                ENGLISH           .86        .17       .38 -   1.00       76

INCORRECT ANSWERS AFTER WHICH TEACHER GAVE SUSTAINING FEEDBACK

    FORMULA:  31+32+33/20

                                 MEAN      SIGMA          RANGE            N
ID = 09213      MATH              .20        .17      0.00 -   1.00       56
                ENGLISH           .23        .15      0.00 -    .63       77

DONT KNOW/NO RESPONSE ANSWERS WHICH TEACHER GAVE SUSTAINING FEEDBACK

    FORMULA:  42+43+44/21+22

                                 MEAN      SIGMA          RANGE            N
ID = 09214      MATH              .22        .16      0.00 -    .56       53
                ENGLISH           .19        .16      0.00 -    .71       76

ALL RESPONSE OPPORTUNITIES WHICH TEACHER GAVE SUSTAINING FEEDBACK

    FORMULA:  87+88+...98/1+2+3+4

                                 MEAN      SIGMA          RANGE            N
ID = 09215      MATH              .12        .08       .01 -    .33       56
                ENGLISH           .10        .07      0.00 -    .36       78

STUDENT INITIATED QUESTIONS AND COMMENTS WHICH WERE QUESTIONS

    FORMULA:  200/200+201

                                 MEAN      SIGMA          RANGE            N
ID = 09216      MATH              .74        .13       .32 -   1.00       56
                ENGLISH           .63        .14       .25 -    .91       78
```

210

Table 3.2 (cont.)

```
STUDENT INITIATED QUESTIONS AND COMMENTS WHICH WERE COMMENTS

     FORMULA:  201/200+201

                                 MEAN      SIGMA          RANGE          N
ID = 89217     MATH               .26        .13      0.00 -   .68      56
               ENGLISH            .37        .14       .09 -   .75      78

STUDENT INITIATED QUESTIONS WHICH WERE CALLED OUT

     FORMULA:  202/200

                                 MEAN      SIGMA          RANGE          N
ID = 89218     MATH               .61        .25       .03 -   .98      56
               ENGLISH            .67        .25      0.00 -  1.00      78

STUDENT INITIATED CALLED OUT QUESTIONS WHICH WERE RELEVANT

     FORMULA:  203/200

                                 MEAN      SIGMA          RANGE          N
ID = 89219     MATH               .57        .23       .03 -   .96      56
               ENGLISH            .62        .23      0.00 -  1.00      78

STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND CRITICIZED

     FORMULA:  204/200

                                 MEAN      SIGMA          RANGE          N
ID = 89220     MATH               .01        .01      0.00 -   .06      56
               ENGLISH            .01        .02      0.00 -   .12      78

STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND IGNORED

     FORMULA:  205/200

                                 MEAN      SIGMA          RANGE          N
ID = 89221     MATH               .01        .02      0.00 -   .08      56
               ENGLISH            .02        .03      0.00 -   .17      78

STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND NOT ACCEPTED

     FORMULA:  206/200

                                 MEAN      SIGMA          RANGE          N
ID = 89222     MATH               .01        .02      0.00 -   .07      56
               ENGLISH            .01        .02      0.00 -   .09      78
```

211

Table 3.2 (cont.)

```
STUDENT INITIATED RELEVANT QUESTIONS CALLED OUT AND GIVEN FEEDBACK

     FORMULA:  207/200

                                 MEAN      SIGMA          RANGE           N
ID = 09223     MATH               .01        .17        .01 -    .78     56
               ENGLISH            .52        .21       0.00 -    .89     78

STUDENT INITIATED RELEVANT Q. CALLED OUT AND GIVEN PROCESS FEEDBACK

     FORMULA:  208/200

                                 MEAN      SIGMA          RANGE           N
ID = 09224     MATH               .13        .10       0.00 -    .53     56
               ENGLISH            .06        .04       0.00 -    .19     78

STUDENT INITIATED RELEVANT Q. CALLED OUT AND INTEGRATED INTO CLASS
DISCUSSION
     FORMULA:  209/200

                                 MEAN      SIGMA          RANGE           N
ID = 09225     MATH               .03        .05       0.00 -    .28     56
               ENGLISH            .01        .02       0.00 -    .13     78

STUDENT INITIATED CALLED QUESTIONS WHICH WERE IRRELEVANT

     FORMULA:  210/200

                                 MEAN      SIGMA          RANGE           N
ID = 09226     MATH               .05        .07       0.00 -    .43     56
               ENGLISH            .05        .05       0.00 -    .19     78

STUDENT INITIATED IRRELEVANT QUESTIONS CALLED OUT AND IGNORED

     FORMULA:  211/200

                                 MEAN      SIGMA          RANGE           N
ID = 09227     MATH               .01        .02       0.00 -    .13     56
               ENGLISH            .01        .02       0.00 -    .11     78

STUDENT INITIATED IRRELEVANT QUESTIONS CALLED OUT AND NOT ACCEPTED

     FORMULA:  212/200

                                 MEAN      SIGMA          RANGE           N
ID = 09228     MATH               .01        .01       0.00 -    .06     56
               ENGLISH            .01        .01       0.00 -    .04     78
```

Table 3.2 (cont.)

```
STUDENT INITIATED IRRELEVANT QUESTION CALLED OUT AND GIVEN FEEDBACK

     FORMULA:  213/200

                                  MEAN       SIGMA           RANGE             N
ID = 09229     MATH                .03         .05        0.00 -   .28        56
               ENGLISH             .03         .03        0.00 -   .13        78

STUDENT INITIATED QUESTIONS WHICH WERE NOT CALLED OUT

     FORMULA:  214/200

                                  MEAN       SIGMA           RANGE             N
ID = 09230     MATH                .39         .25         .02 -   .97        56
               ENGLISH             .33         .25        0.00 -  1.00        78

STUDENT INITIATED QUESTIONS WHICH WERE RELEVANT

     FORMULA:  215/200

                                  MEAN       SIGMA           RANGE             N
ID = 09231     MATH                .30         .25         .02 -   .97        56
               ENGLISH             .32         .23        0.00 -   .88        78

STUDENT INITIATED RELEVANT QUESTIONS WHICH WERE NOT ACCEPTED

     FORMULA:  216/200

                                  MEAN       SIGMA           RANGE             N
ID = 09232     MATH                .01         .01        0.00 -   .06        56
               ENGLISH             .00         .01        0.00 -   .03        78

STUDENT INITIATED RELEVANT QUESTIONS WHICH WERE GIVEN FEEDBACK

     FORMULA:  217/200

                                  MEAN       SIGMA           RANGE             N
ID = 09233     MATH                .24         .19        0.00 -   .83        56
               ENGLISH             .26         .21        0.00 -   .88        78

STUDENT INITIATED RELEVANT QUESTIONS GIVEN PROCESS FEEDBACK

     FORMULA:  218/200

                                  MEAN       SIGMA           RANGE             N
ID = 09234     MATH                .13         .11        0.00 -   .55        56
               ENGLISH             .05         .06        0.00 -   .33        78
```

Table 3.2 (cont.)

```
STUDENT INITIATED RELEVANT QUESTIONS WHICH WERE REDIRECTED

     FORMULA:  219/200

                              MEAN      SIGMA          RANGE           N
ID = 09235    MATH             .04        .01     0.00 -   .06        56
              ENGLISH          .01        .02     0.00 -   .08        78

STUDENT INITIATED RELEVANT QUESTIONS INTEGRATED INTO CLASS DISCUS.

     FORMULA:  220/200

                              MEAN      SIGMA          RANGE           N
ID = 09236    MATH             .02        .03     0.00 -   .13        56
              ENGLISH          .00        .01     0.00 -   .08        78

STUDENT INITIATED QUESTIONS WHICH WERE IRRELEVANT

     FORMULA:  221/200

                              MEAN      SIGMA          RANGE           N
ID = 09237    MATH             .01        .02     0.00 -   .09        56
              ENGLISH          .02        .03     0.00 -   .13        78

STUDENT INITIATED IRRELEVANT QJESTIONS WHICH WERE GIVEN FEEDBACK

     FORMULA:  222/200

                              MEAN      SIGMA          RANGE           N
ID = 09238    MATH             .01        .02     0.00 -   .09        56
              ENGLISH          .01        .02     0.00 -   .08        78

STUDENT INITIATED COMMENTS WHICH WERE CALLED OUT

     FORMULA:  223/201

                              MEAN      SIGMA          RANGE           N
ID = 09239    MATH             .73        .27     0.00 -  1.00        55
              ENGLISH          .72        .25     0.00 -  1.00        78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE CALLED OUT

     FORMULA:  224/201

                              MEAN      SIGMA          RANGE           N
ID = 09240    MATH             .52        .24     0.00 -  1.00        55
              ENGLISH          .53        .22     0.00 -  1.00        78
```

Table 3.2 (cont.)

```
STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND PRAISED

      FORMULA:  225/201

                                MEAN      SIGMA          RANGE         N
ID = 09241      MATH             .02        .03      0.00 -    .13     55
                ENGLISH          .02        .03      0.00 -    .14     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND CRITICIZED

      FORMULA:  226/201

                                MEAN      SIGMA          RANGE         N
ID = 09242      MATH             .01        .02      0.00 -    .11     55
                ENGLISH          .01        .03      0.00 -    .18     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND IGNORED

      FORMULA:  227/201

                                MEAN      SIGMA          RANGE         N
ID = 09243      MATH             .05        .07      0.00 -    .33     55
                ENGLISH          .03        .05      0.00 -    .24     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND NOT ACCEPTED

      FORMULA:  228/201

                                MEAN      SIGMA          RANGE         N
ID = 09244      MATH             .02        .05      0.00 -    .33     55
                ENGLISH          .02        .03      0.00 -    .14     78

STUDENT INITIATED RELEVANT COMMENTS CALLED OUT AND GIVEN FEEDBACK

      FORMULA:  229/201

                                MEAN      SIGMA          RANGE         N
ID = 09245      MATH             .36        .18      0.00 -    .73     55
                ENGLISH          .45        .21      0.00 -   1.00     78

S. INITIATED RELEVANT COMMENTS CALLED OUT AND GIVEN PROCESS FEEDBACK

      FORMULA:  230/201

                                MEAN      SIGMA          RANGE         N
ID = 09246      MATH             .08        .10      0.00 -    .67     55
                ENGLISH          .04        .05      0.00 -    .32     78
```

Table 3.2 (cont.)

```
6. INITIATED RELEVANT COMMENTS CALLED OUT AND INTEGRATED INTO
DISCUSSION
      FORMULA:  231/201

                                  MEAN      SIGMA          RANGE            N
ID = 09247     MATH               .02        .04       0.00 -   .18        55
               ENGLISH            .02        .07       0.00 -   .57        78

STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE CALLED OUT

      FORMULA:  232/201

                                  MEAN      SIGMA          RANGE            N
ID = 09248     MATH               .21        .21       0.00 -   .91        55
               ENGLISH            .18        .20       0.00 -   .93        78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND CRITICIZED

      FORMULA:  233/201

                                  MEAN      SIGMA          RANGE            N
ID = 09249     MATH               .01        .02       0.00 -   .11        55
               ENGLISH            .01        .02       0.00 -   .11        78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND IGNORED

      FORMULA:  234/201

                                  MEAN      SIGMA          RANGE            N
ID = 09250     MATH               .10        .12       0.00 -   .44        55
               ENGLISH            .08        .13       0.00 -   .73        78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND NOT ACCEPTED

      FORMULA:  235/201

                                  MEAN      SIGMA          RANGE            N
ID = 09251     MATH               .03        .06       0.00 -   .33        55
               ENGLISH            .03        .05       0.00 -   .23        78

STUDENT INITIATED IRRELEVANT COMMENTS CALLED OUT AND GIVEN FEEDBACK

      FORMULA:  236/201

                                  MEAN      SIGMA          RANGE            N
ID = 09252     MATH               .08        .09       0.00 -   .33        55
               ENGLISH            .06        .08       0.00 -   .50        78
```

Table 3.2 (cont.)

```
STUDENT INITIATED RELEVANT COMMENTS WHICH WERE NOT CALLED OUT

        FORMULA:  238/201

                                MEAN      SIGMA          RANGE          N
ID = 09254      MATH             .21        .23      0.00 -  1.00      55
                ENGLISH          .25        .22      0.00 -   .86      78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE GIVEN PRAISE

        FORMULA:  239/201

                                MEAN      SIGMA          RANGE          N
ID = 09255      MATH             .03        .07      0.00 -   .50      55
                ENGLISH          .02        .04      0.00 -   .27      78

STUDENT INITIATED RELEVANT COMMENTS WHICH WERE GIVEN FEEDBACK

        FORMULA:  240/201

                                MEAN      SIGMA          RANGE          N
ID = 09256      MATH             .16        .21      0.00 -  1.00      55
                ENGLISH          .20        .19      0.00 -   .78      78

STUDENT INITIATED RELEVANT COMMENTS GIVEN PROCESS FEEDBACK

        FORMULA:  241/201

                                MEAN      SIGMA          RANGE          N
ID = 09257      MATH             .03        .06      0.00 -   .32      55
                ENGLISH          .04        .06      0.00 -   .22      78

STUDENT INITIATED RELEVANT COMMENTS INTEGRATED INTO CLASS DISCUSSION

        FORMULA:  242/201

                                MEAN      SIGMA          RANGE          N
ID = 09258      MATH             .01        .02      0.00 -   .08      55
                ENGLISH          .03        .07      0.00 -   .36      78

STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE IGNORED

        FORMULA:  244/201

                                MEAN      SIGMA          RANGE          N
ID = 09260      MATH             .02        .06      0.00 -   .33      55
                ENGLISH          .01        .03      0.00 -   .11      78
```

Table 3.2 (cont.)

```
STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE NOT ACCEPTED

      FORMULA:  245/201

                                MEAN      SIGMA          RANGE          N
ID = 09261     MATH              .02        .07      0.00 -    .50     55
               ENGLISH           .01        .02      0.00 -    .09     78

STUDENT INITIATED IRRELEVANT COMMENTS WHICH WERE GIVEN FEEDBACK

      FORMULA:  246/201

                                MEAN      SIGMA          RANGE          N
ID = 09262     MATH              .02        .05      0.00 -    .25     55
               ENGLISH           .02        .05      0.00 -    .31     78

ALL STUDENT INITIATED QUESTIONS/COMMENTS WHICH WERE PRAISED

      FORMULA:  204+205+206+216/203+215

                                MEAN      SIGMA          RANGE          N
ID = 09263     MATH              .01        .02      0.00 -    .08     56
               ENGLISH           .01        .02      0.00 -    .10     78

ALL STUDENT INITIATED QUESTIONS/COMMENTS WHICH WERE CRITICIZED

      FORMULA:  211+212/210+221

                                MEAN      SIGMA          RANGE          N
ID = 09264     MATH              .01        .02      0.00 -    .08     56
               ENGLISH           .01        .02      0.00 -    .10     78

STUDENT CREATED CONTACTS RELATED TO ACADEMIC CONTENT

      FORMULA:  247/247+248+256+340

                                MEAN      SIGMA          RANGE          N
ID = 09267     MATH              .64        .12       .28 -    .84     56
               ENGLISH           .51        .14       .13 -    .88     78

STUDENT CREATED CONTACTS RELATED TO CLASSROOM PROCEDURE

      FORMULA:  248/247+248+256+340

                                MEAN      SIGMA          RANGE          N
ID = 09268     MATH              .24        .10       .09 -    .53     56
               ENGLISH           .33        .10       .12 -    .56     78
```

Table 3.2 (cont.)

```
STUDENT CREATED ACADEMIC RELATED CONTACTS WHICH WERE PRAISED

      FORMULA:  249/247

                                MEAN      SIGMA         RANGE          N
ID = 09269    MATH               .02        .02     0.00 -   .11      56
              ENGLISH            .02        .03     0.00 -   .17      78

STUDENT CREATED ACADEMIC RELATED CONTACTS WHICH WERE CRITICIZED

   FORMULA:  250/247

                                MEAN      SIGMA         RANGE          N
ID = 09270    MATH               .01        .01     0.00 -   .09      56
              ENGLISH            .01        .02     0.00 -   .15      78

S. CREATED ACADEMIC RELATED CONTACTS INVOLVING BRIEF TEACHER CONTACT

   FORMULA:  251/247

                                MEAN      SIGMA         RANGE          N
ID = 09271    MATH               .55        .16      .20 -   .91      56
              ENGLISH            .65        .16      .27 -   .95      78

S. CREATED ACADEMIC RELATED CONTACTS INVOLVING LONG TEACHER CONTACT

  FORMULA:  252/247

                                MEAN      SIGMA         RANGE          N
ID = 09272    MATH               .44        .16      .07 -   .79      56
              ENGLISH            .33        .16      .04 -   .68      78

S. CREATED ACADEMIC RELATED CONTACTS IN WHICH TEACHER DELAYS CONTACT
  FORMULA:  253/247

                                MEAN      SIGMA         RANGE          N
ID = 09273    MATH               .02        .02     0.00 -   .10      56
              ENGLISH            .01        .01     0.00 -   .05      78

STUDENT CREATED ACADEMIC RELATED CONTACTS GIVEN FEEDBACK

  FORMULA:  254/247

                                MEAN      SIGMA         RANGE          N
ID = 09274    MATH               .47        .15      .12 -   .74      56
              ENGLISH            .63        .19      .14 -   .98      78
```

Table 3.2 (cont.)

```
STUDENT CREATED ACADEMIC RELATED CONTACTS GIVEN PROCESS FEEDBACK

 FORMULA:  255/247

                                  MEAN      SIGMA           RANGE           N
ID = 09275     MATH               .47        .12        .26 -    .66       56
               ENGLISH            .30        .13       0.00 -    .61       70

STUDENT CREATED CONTACTS WHICH INVOLVED PERSONAL REQUESTS

 FORMULA:  256/247+248+256+340
                                  MEAN      SIGMA           RANGE           N
ID = 09276     MATH               .07        .04        .01 -    .18       56
               ENGLISH            .08        .05        .01 -    .23       70

STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER GRANTED

 FORMULA:  257/256

                                  MEAN      SIGMA           RANGE           N
ID = 09277     MATH               .71        .16        .33 -   1.00       56
               ENGLISH            .75        .16       0.00 -   1.00       70

STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER DELAYED

 FORMULA:  258/256

                                  MEAN      SIGMA           RANGE           N
ID = 09278     MATH               .06        .05       0.00 -    .25       56
               ENGLISH            .07        .08       0.00 -    .50       70

STUDENT CREATED PERSONAL CONTACTS WHICH TEACHER DID NOT GRANT

 FORMULA:  259/256

                                  MEAN      SIGMA           RANGE           N
ID = 09279     MATH               .20        .16       0.00 -    .67       56
               ENGLISH            .10        .13       0.00 -    .52       70

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN BRIEF FEEDBACK

 FORMULA:  260/247

                                  MEAN      SIGMA           RANGE           N
ID = 09280     MATH               .45        .15        .11 -    .70       56
               ENGLISH            .59        .19        .13 -    .94       70
```

Table 3.2 (cont.)

```
STUDENT CREATED CONTENT RELATED CONTACTS GIVEN BRIEF PROCESS FEEDBACK

 FORMULA:  261/247

                                MEAN      SIGMA          RANGE          N
ID = 092A1     MATH              .08        .09      0.00 -    .33     56
               ENGLISH           .03        .03      0.00 -    .15     78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN LONG FEEDBACK

 FORMULA:  262/247

                                MEAN      SIGMA          RANGE          N
ID = 092A2     MATH              .02        .03      0.00 -    .15     56
               ENGLISH           .03        .04      0.00 -    .16     78

STUDENT CREATED CONTENT RELATED CONTACTS GIVEN LONG PROCESS FEEDBACK

 FOMRULA:  263/247

                                MEAN      SIGMA          RANGE          N
ID = 092A3     MATH              .39        .14       .06 -    .65     56
               ENGLISH           .27        .14      0.00 -    .60     78

TEACHER INITIATED CONTACTS WHICH WERE ACADEMIC RELATED

 FORMULA:  264/264+276+339

                                MEAN      SIGMA          RANGE          N
ID = 092A4     MATH              .59        .16       .19 -    .91     56
               ENGLISH           .51        .17       .05 -    .88     78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED PRAISE

 FORMULA:  265/264

                                MEAN      SIGMA          RANGE          N
ID = 092A5     MATH              .03        .04      0.00 -    .18     56
               ENGLISH           .06        .05      0.00 -    .25     78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED CRITICISM

 FORMULA:  266/264

                                MEAN      SIGMA          RANGE          N
ID = 092A6     MATH              .07        .10      0.00 -    .40     56
               ENGLISH           .08        .11      0.00 -    .49     78
```

Table 3.2 (cont.)

```
TEACHER INITIATED ACADEMIC CONTACTS WHICH WERE BRIEF

  FORMULA:  267/264

                                 MEAN        SIGMA           RANGE           N
ID = 09287      MATH              .53          .16        .10 -   .95        56
                ENGLISH           .58          .19       0.00 -  1.00        78

TEACHER INITIATED ACADEMIC CONTACTS WHICH WERE LONG

  FORMULA:  268/264

                                 MEAN        SIGMA           RANGE           N
ID = 09288      MATH              .31          .15        .05 -   .71        56
                ENGLISH           .25          .20       0.00 -  1.00        78

TEACHER INITIATED ACADEMIC CONTACTS INVOLVING OBSERVATION OF STUDENT

  FORMULA:  269/264

                                 MEAN        SIGMA           RANGE           N
ID = 09289      MATH              .16          .14       0.00 -   .56        56
                ENGLISH           .14          .16       0.00 -   .63        78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED FEEDBACK
  FORMULA:  270/264

                                 MEAN        SIGMA           RANGE           N
ID = 09290      MATH              .51          .18        .08 -   .93        56
                ENGLISH           .59          .20       0.00 -   .96        78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED PROCESS FEEDBACK

  FORMULA:  271/264

                                 MEAN        SIGMA           RANGE           N
ID = 09291      MATH              .27          .12        .06 -   .58        56
                ENGLISH           .22          .16        .02 -  1.00        78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED BRIEF FEEDBACK

  FORMULA:  272/264

                                 MEAN        SIGMA           RANGE           N
ID = 09292      MATH              .47          .17        .08 -   .93        56
                ENGLISH           .54          .20       0.00 -   .95        78
```

Table 3.2 (cont.)

```
TEACHER INIT ACADEMIC CONTACTS WHICH INVOLVED BRIEF PROCESS FEEDBACK

  FORMULA:  273/264

                                MEAN       SIGMA          RANGE          N
ID = 09293     MATH              .03         .03      0.00 -   .13      56
               ENGLISH           .01         .02      0.00 -   .09      78

TEACHER INITIATED ACADEMIC CONTACTS WHICH INVOLVED LONG FEEDBACK

  FORMULA:  274/264

                                MEAN       SIGMA          RANGE          N
ID = 09294     MATH              .04         .05      0.00 -   .22      56
               ENGLISH           .05         .06      0.00 -   .33      78

TEACHER INIT ACADEMIC CONTACTS WHICH INVOLVED LONG PROCESS FEEDBACK

  FOMRULA:  275/264

                                MEAN       SIGMA          RANGE          N
ID = 09295     MATH              .24         .11       .03 -   .51      56
               ENGLISH           .20         .16      0.00 -  1.00      78

TEACHER INITIATED CONTACTS WHICH RELATED TO CLASSROOM PROCEDURE

  FORMULA:  276/264+276+339

                                MEAN       SIGMA          RANGE          N
ID = 09296     MATH              .35         .16       .05 -   .72      56
               ENGLISH           .42  [illegible]      .12 -   .86      78

MISBEHAVIORS TO WHICH TEACHER RESPONDED BUT CODER DID NOT OBSERVE

  FORMULA:  277/277+278+...+289

                                MEAN       SIGMA          RANGE          N
ID = 09297     MATH              .01         .02      0.00 -   .08      56
               ENGLISH           .01         .02      0.00 -   .08      78

NONDISRUPTIVE MISBEHAVIORS (DAYDREAMING, WASTING TIME)

  FOMRULA:  278/277+278+...+289

                                MEAN       SIGMA          RANGE          N
ID = 09298     MATH              .41         .14       .13 -   .86      56
               ENGLISH           .40         .13       .13 -   .72      78
```

Table 3.2 (cont.)

```
MISBEHAVIORS INVOLVING STUDENT SOCIALIZING

   FORMULA:  279/277+...+289

                              MEAN     SIGMA           RANGE            N
ID = 09299     MATH            .30       .12       .10 -    .62         56
               ENGLISH         .39       .14       .16 -    .79         78

STUDENTS BEING LATE TO CLASS

   FORMULA:  280/277+...289

                              MEAN     SIGMA           RANGE            N
ID = 09300     MATH            .01       .02      0.00 -    .10         56
               ENGLISH         .01       .01      0.00 -    .07         78

DISRUPTIVE MISBEHAVIORS (LOUD TALKING, DISTURBING OTHERS)

   FORMULA:  281/277...+289

                              MEAN     SIGMA           RANGE            N
ID = 09301     MATH            .11       .09      0.00 -    .50         56
               ENGLISH         .11       .08      0.00 -    .36         78

MISBEHAVIORS DURING WHICH STUDENT SASSED OR DEFIED TEACHER

   FORMULA:  282/277...+289

                              MEAN     SIGMA           RANGE            N
ID = 09302     MATH            .03       .03      0.00 -    .19         56
               ENGLISH         .02       .03      0.00 -    .14         78

MISBEHAVIORS DURING WHICH STUDENT WAS VERBALLY AGGRESSIVE

   FORMULA:  283/277...+289

                              MEAN     SIGMA           RANGE            N
ID = 09303     MATH            .01       .01      0.00 -    .05         56
               ENGLISH         .01       .02      0.00 -    .17         78

MISBEHAVIORS DURING WHICH STUDENT WAS PHYSICALLY AGGRESSIVE

   FORMULA:  284/277...+289

                              MEAN     SIGMA           RANGE            N
ID = 09304     MATH            .01       .02      0.00 -    .07         56
               ENGLISH         .01       .02      0.00 -    .08         78
```

Table 3.2 (cont.)

```
MISBEHAVIORS INVOLVING STUDENTS LEAVING CLASS WITHOUT PERMISSION

    FORMULA:  285/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09305     MATH                   .01         .02      0.00 -    .12       56
               ENGLISH                .00         .01      0.00 -    .03       78

MISBEHAVIORS INVOLVING CONTRABAND ITEMS (KNIVES, RADIOS)

    FORMULA:  286/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09306     MATH                   .01         .01      0.00 -    .07       56
               ENGLISH                .01         .02      0.00 -    .15       78

MISBEHAVIORS INVOLVING STUDENTS BAITING TEACHER

    FORMULA:  287/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09307     MATH                   .01         .02      0.00 -    .09       56
               ENGLISH                .01         .02      0.00 -    .09       78

MISBEHAVIORS INVOLVING STUDENT SLEEPING IN CLASS

    FORMULA:  288/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09308     MATH                   .02         .06      0.00 -    .35       56
               ENGLISH                .01         .02      0.00 -    .10       78

MISBEHAVIORS WHICH COULD NOT BE CLASSIFIED IN THE ABOVE

    FORMULA:  289/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09309     MATH                   .02         .03      0.00 -    .14       56
               ENGLISH                .01         .02      0.00 -    .09       78

MISBEHAVIORS IN WHICH TEACHER INTERVENED NONVERBALLY

    FORMULA:  292/277...+289

                                     MEAN       SIGMA          RANGE            N
ID = 09317     MATH                   .03         .03      0.00 -    .14       56
               ENGLISH                .04         .04      0.00 -    .18       78
```

Table 3.2 (cont.)

```
MISBEHAVIORS WHICH INVOLVED MANAGEMENT REQUEST FROM TEACHER

     FORMULA:  293/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,13    MATH             .63         .18       .31 -  1.00       56
                ENGLISH          .66         .15       .20 -   .89       78

MANAGEMENT REQUEST AFTER MISBEHAVIOR DIRECTED TO WRONG S. (TARGET
ERROR)
     FORMULA:  294/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,14    MATH             .02         .02      0.00 -   .07       56
                ENGLISH          .01         .02      0.00 -   .08       78

MISBEHAVIORS IN WHICH TEACHER DELAYED MGMNT REQ. (TIMING ERROR)

     FORMULA:  295/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,15    MATH             .04         .05      0.00 -   .25       56
                ENGLISH          .03         .04      0.00 -   .19       78

TEACHER OVERREACTED WITH A MANAGEMENT REQUEST TO STUDENT MISBEHAVIOR

     FORMULA:  296/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,16    MATH             .00         .00      0.00 -   .02       56
                ENGLISH          .00         .01      0.00 -   .13       78

MISBEHAVIORS WHICH TEACHER CRITICIZED

     FORMULA:  297/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,17    MATH             .13         .11      0.00 -   .60       56
                ENGLISH          .13         .13      0.00 -   .60       78

MISBEHAVIORS IN WHICH TEACHER CRITICIZED WRONG STUDENT (TARGET ERROR)

     FORMULA:  298/277...+289

                                MEAN       SIGMA          RANGE           N
ID = 0093,18    MATH             .01         .02      0.00 -   .14       56
                ENGLISH          .00         .00      0.00 -   .02       78
```

Table 3.2 (cont.)

```
MISBEHAVIORS IN WHICH TEACHER DELAYED CRITICISM (TIMING ERROR)

      FORMULA:  299/277...+289

                                MEAN      SIGMA          RANGE           N
ID = 09319      MATH             .01        .02       0.00 -   .08      56
                ENGLISH          .01        .01       0.00 -   .04      78

MISBEHAVIORS IN WHICH TEACHER OVERREACTED WITH CRITICISM

      FORMULA:  300/277...+289

                                MEAN      SIGMA          RANGE           N
ID = 09320      MATH             .01        .01       0.00 -   .06      56
                ENGLISH          .01        .01       0.00 -   .07      78

MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

      FORMULA:  301/277+...289

                                MEAN      SIGMA          RANGE           N
ID = 09321      MATH             .05        .04       0.00 -   .19      56
                ENGLISH          .05        .04       0.00 -   .17      78

MISBEHAVIORS IN WHICH TEACHER DELAYED THREAT (TIMING ERROR)

      FORMULA:  302/277...+289

                                MEAN      SIGMA          RANGE           N
ID = 09322      MATH             .00        .01       0.00 -   .07      56
                ENGLISH          .00        .01       0.00 -   .05      78

MISBEHAVIORS IN WHICH TEACHER OVERREACTED WITH THREAT

      FORMULA:  303/277...+289

                                MEAN      SIGMA          RANGE           N
ID = 09323      MATH             .00        .01       0.00 -   .03      56
                ENGLISH          .01        .02       0.00 -   .13      78

MISBEHAVIORS INVOLVING MANAGEMENT REQUEST THAT CODER DID NOT OBSERVE

      FORMULA:  304/277

                                MEAN      SIGMA          RANGE           N
ID = 09324      MATH             .53        .41       0.00 -  1.00      27
                ENGLISH          .60        .43       0.00 -  1.00      40
```

Table 3.2 (cont.)

```
MISBEHAVIORS WHICH TEACHER CRITICIZED THAT CODER DID NOT OBSERVE

       FORMULA:  305/277

                                 MEAN      SIGMA          RANGE          N
ID = 09325     MATH               .37        .37      0.00 -  1.00      27
               ENGLISH            .26        .37      0.00 -  1.00      40

MILD MISBEHAVIORS WHERE TEACHER INTERVENED NONVERBALLY

       FORMULA:  307/278

                                 MEAN      SIGMA          RANGE          N
ID = 09327     MATH               .02        .04      0.00 -   .15      56
               ENGLISH            .04        .08      0.00 -   .67      78

MILD MISBEHAVIORS INVOLVING MANAGEMENT REQUEST FROM TEACHER

       FORMULA:  308/278

                                 MEAN      SIGMA          RANGE          N
ID = 09328     MATH               .79        .10       .57 -  1.00      56
               ENGLISH            .79        .14       .29 -  1.00      78

MILD MISBEHAVIORS WHICH TEACHER CRITICIZED

       FORMULA:  309/278

                                 MEAN      SIGMA          RANGE          N
ID = 09329     MATH               .14        .09      0.00 -   .37      56
               ENGLISH            .13        .13      0.00 -   .71      78

MILD MISBEHAVIORS WHERE TEACHER THREATENED STUDENT

       FORMULA:  310/278

                                 MEAN      SIGMA          RANGE          N
ID = 09330     MATH               .04        .05      0.00 -   .25      56
               ENGLISH            .04        .04      0.00 -   .22      78

SOCIALIZING MISBEHAVIORS IN WHICH TEACHER INTERVENED NONVERBALLY

       FORMULA:  311/279

                                 MEAN      SIGMA          RANGE          N
ID = 09331     MATH               .04        .11      0.00 -   .80      56
               ENGLISH            .05        .06      0.00 -   .27      78
```

Table 3.2 (cont.)

```
SOCIALIZING MISBEHAVIORS INVOLVING A MANAGEMENT REQUEST

        FORMULA:  312/279

                                 MEAN      SIGMA           RANGE          N
ID = 09332      MATH              .73        .18       .00 -  1.00       56
                ENGLISH           .78        .18       .14 -  1.00       78

SOCIALIZING MISBEHAVIORS IN WHICH TEACHER CRITICIZED STUDENT

        FORMULA:  313/27[illegible]

                                 MEAN      SIGMA           RANGE          N
ID = 09333      MATH              .15        .15      0.00 -   .89       56
                ENGLISH           .14        .16      0.00 -   .71       78

SOCIALIZING MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

        FORMULA:  314/279

                                 MEAN      SIGMA           RANGE          N
ID = 09334      MATH              .07        .08      0.00 -   .33       56
                ENGLISH           .07        .08      0.00 -   .42       78

TARDINESS GIVEN A MANAGEMENT REQUEST

    FORMULA:  315/280

                                 MEAN      SIGMA           RANGE          N
ID = 09335      MATH              .64        .39      0.00 -  1.00       23
                ENGLISH           .63        .42      0.00 -  1.00       31

MISBEHAVIORS INVOLVING TARDINESS WHICH TEACHER CRITICIZED

    FORMULA:  316/280

                                 MEAN      SIGMA           RANGE          N
ID = 09336      MATH              .21        .32      0.00 -  1.00       23
                ENGLISH           .31        .40      0.00 -  1.00       31

DISRUPTIVE MISBEHAVIORS IN WHICH TEACHER INTERVENED NONVERBALLY

    FORMULA:  318/281

                                 MEAN      SIGMA           RANGE          N
ID = 09338      MATH              .05        .09      0.00 -   .38       52
                ENGLISH           .06        .13      0.00 -   .67       78
```

Table 3.2 (cont.)

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DISRUPTIVE MISBEHAVIORS INVOLVING A MANAGEMENT REQUEST

 FORMULA:  319/281

                            MEAN      SIGMA          RANGE           N
ID = 09339    MATH           .52        .29     0.00 -  1.00        52
              ENGLISH        .55        .25     0.00 -  1.00        70

DISRUPTIVE MISBEHAVIORS WHICH TEACHER CRITICIZED

 FORMULA:  320/281

                            MEAN      SIGMA          RANGE           N
ID = 09340    MATH           .26        .29     0.00 -  1.00        52
              ENGLISH        .23        .23     0.00 -  1.00        70

DISRUPTIVE MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

 FORMULA:  321/281

                            MEAN      SIGMA          RANGE           N
ID = 09341    MATH           .06        .08     0.00 -   .29        52
              ENGLISH        .08        .12     0.00 -   .50        70

DEFIANCE OF TEACHER RESPONDED TO WITH A MANAGEMENT REQUEST

 FORMULA:  322/282

                            MEAN      SIGMA          RANGE           N
ID = 09342    MATH           .43        .35     0.00 -  1.00        37
              ENGLISH        .46        .35     0.00 -  1.00        48

DEFIANCE OF TEACHER WHICH TEACHER CRITICIZED

 FORMULA:  323/282

                            MEAN      SIGMA          RANGE           N
ID = 09343    MATH           .19        .26     0.00 -  1.00        37
              ENGLISH        .19        .29     0.00 -  1.00        48

DEFIANCE OF TEACHER RESPONDED TO WITH TEACHER THREATENING STUDENT

 FORMULA:  324/282

                            MEAN      SIGMA          RANGE           N
ID = 09344    MATH           .14        .28     0.00 -  1.00        37
              ENGLISH        .11        .23     0.00 -  1.00        48
```

Table 3.2 (cont.)

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STUDENT VERBAL AGGRESSION HANDLED BY A MANAGEMENT REQUEST

FORMULA:  325/283

                                MEAN     SIGMA         RANGE          N
ID = 09345     MATH              .39      .45      0.00 -  1.00      22
               ENGLISH           .53      .46      0.00 -  1.00      30

STUDENT PHYSICAL AGGRESSION HANDLED BY A MANAGEMENT REQUEST

FORMULA:  327/284

                                MEAN     SIGMA         RANGE          N
ID = 09347     MATH              .56      .42      0.00 -  1.00      26
               ENGLISH           .46      .43      0.00 -  1.00      32

STUDENT PHYSICAL AGGRESSION WHICH TEACHER CRITICIZED

FORMULA:  328/284

                                MEAN     SIGMA         RANGE          N
ID = 09348     MATH              .17      .32      0.00 -  1.00      26
               ENGLISH           .18      .31      0.00 -  1.00      32

LEAVING ROOM WITHOUT PERMISSION RESPONDED TO WITH MANAGEMENT REQUEST

FORMULA:  330/285

                                MEAN     SIGMA         RANGE          N
ID = 09350     MATH              .52      .43      0.00 -  1.00      20
               ENGLISH           .59      .41      0.00 -  1.00      21

STUDENT CONTRABAND WHICH TEACHER HANDLES WITH MANAGEMENT REQUEST

FORMULA:  332/286

                                MEAN     SIGMA         RANGE          N
ID = 09352     MATH              .56      .44      0.00 -  1.00      28
               ENGLISH           .60      .44      0.00 -  1.00      30

STUDENT CONTRABAND WHICH TEACHER HANDLES BY THREATENING STUDENT

   FORMULA:  333/286

                                MEAN     SIGMA         RANGE          N
ID = 09353     MATH              .13      .28      0.00 -  1.00      28
               ENGLISH           .13      .29      0.00 -  1.00      30
```

Table 3.2 (cont.)

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STUDENT BAITS TEACHER AND TEACHER HANDLES WITH MANAGEMENT REQUEST

   FORMULA:  334/287

                                  MEAN      SIGMA         RANGE            N
ID = 09354     MATH                .39        .37     0.00 -  1.00        23
               ENGLISH             .30        .36     0.00 -  1.00        33

MISBEHAVIORS NOT IN ABOVE CATEGORIES THAT INVOLVED MGMNT REQUEST

   FORMULA:  337/289

                                  MEAN      SIGMA         RANGE            N
ID = 09357     MATH                .42        .43     0.00 -  1.00        25
               ENGLISH             .40        .43     0.00 -  1.00        34

MISBEHAVIORS NOT IN ABOVE CATEGORIES WHICH TEACHER CRITICIZED

   FORMULA:  338/289

                                  MEAN      SIGMA         RANGE            N
ID = 09358     MATH                .33        .41     0.00 -  1.00        25
               ENGLISH             .29        .42     0.00 -  1.00        34

MISBEHAVIORS WHICH INVOLVED MANAGEMENT REQUESTS

   FORMULA:  304+308+312+315+319+322+325+327+330+332+334+337/277+...+289

                                  MEAN      SIGMA         RANGE            N
ID = 09359     MATH                .69        .12      .36 -  1.00        56
               ENGLISH             .71        .14      .20 -   .90        78

MISBEHAVIORS WHICH TEACHER CRITICIZED
   FORMULA:  305+309+313+316+320+323+328+338/277+...+289

                                  MEAN      SIGMA         RANGE            N
ID = 09360     MATH                .16        .11     0.00 -   .62        56
               ENGLISH             .15        .13     0.00 -   .60        78

MISBEHAVIORS IN WHICH TEACHER THREATENED STUDENT

   FORMULA:  306+310+314+317+321+324+326+329+331+333+335+336/277+...289

                                  MEAN      SIGMA         RANGE            N
ID = 09361     MATH                .06        .05     0.00 -   .19        56
               ENGLISH             .06        .04     0.00 -   .18        78
```

Table 3.2 (cont.)

```
MISBEHAVIORS IN WHICH TEACHER ACTED W/O TARGET OR TIMING ERROR

    FORMULA:  292+293+297+301/277+...+289

                                 MEAN      SIGMA         RANGE          N
ID = 09362     MATH               .84        .13       .41 -  1.00      56
               ENGLISH            .88        .10       .54 -  1.00      78

MISBEHAVIORS IN WHICH TEACHER ACTED WITH TARGET ERROR

    FORMULA:  294+298/277+...+289

                                 MEAN      SIGMA         RANGE          N
ID = 09363     MATH               .02        .03      0.00 -   .21      56
               ENGLISH            .02        .02      0.00 -   .09      78

MISBEHAVIORS IN WHICH TEACHER ACTED WITH TIMING ERROR

    FORMULA:  295+299+302/277+...+289

                                 MEAN      SIGMA         RANGE          N
ID = 09364     MATH               .05        .07      0.00 -   .32      56
               ENGLISH            .04        .05      0.00 -   .19      78

MISBEHAVIORS IN WHICH TEACHER OVERREACTED

    FORMULA:  296+300+303/277+...+289

                                 MEAN      SIGMA         RANGE          N
ID = 09365     MATH               .01        .02      0.00 -   .07      56
               ENGLISH            .01        .04      0.00 -   .25      78

MILD MISBEHAVIORS INVOLVING MANAGEMENT REQUESTS

    FORMULA:  308+312/278+279

                                 MEAN      SIGMA         RANGE          N
ID = 09366     MATH               .76        .12       .35 -  1.00      56
               ENGLISH            .76        .15       .22 -   .96      78

MILD MISBEHAVIORS INVOLVING TEACHER CRITICISM

    FORMULA:  309+310+313+314/278+279

                                 MEAN      SIGMA         RANGE          N
ID = 09367     MATH               .20        .12      0.00 -   .65      56
               ENGLISH            .18        .14      0.00 -   .67      78
```

Table 3.2 (cont.)

```
SERIOUS MISBEHAVIORS INVOLVING MANAGEMENT REQUESTS

    FORMULA:  319+322+325+327+334/281+282+283+284+287

                                MEAN      SIGMA           RANGE            N
ID = 09368     MATH              .50        .27       0.00 -  1.00        53
               ENGLISH           .50        .24       0.00 -  1.00        74

SERIOUS MISBEHAVIORS INVOLVING TEACHER CRITICISM

    FORMULA:  320+321+323+324+326+328+329+335/281+282+283+284+287

                                MEAN      SIGMA           RANGE            N
ID = 09369     MATH              .28        .28       0.00 -  1.00        53
               ENGLISH           .28        .22       0.00 -  1.00        74

MILD MISBEHAVIORS WHICH TEACHER HANDLED WITHOUT ERROR

    FORMULA:  384/278+279

                                MEAN      SIGMA           RANGE            N
ID = 09370     MATH              .90        .08        .64 -  1.00        56
               ENGLISH           .92        .07        .68 -  1.00        78

MILD MISBEHAVIORS FOR WHICH TEACHER MADE A TARGET ERROR

    FORMULA:  385/278+279

                                MEAN      SIGMA           RANGE            N
ID = 09371     MATH              .03        .04       0.00 -   .27        56
               ENGLISH           .02        .02       0.00 -   .08        78

MILD MISBEHAVIORS FOR WHICH TEACHER MADE A TIMING ERROR

    FORMULA:  386/278+279

                                MEAN      SIGMA           RANGE            N
ID = 09372     MATH              .05        .07       0.00 -   .30        56
               ENGLISH           .04        .05       0.00 -   .23        78

MILD MISBEHAVIORS TO WHICH TEACHER OVERREACTED

    FORMULA:  387/278+279

                                MEAN      SIGMA           RANGE            N
ID = 09373     MATH              .01        .02       0.00 -   .10        56
               ENGLISH           .02        .04       0.00 -   .32        78
```

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Table 3.2 (cont.)

```
SERIOUS MISBEHAVIORS WHICH TEACHER HANDLED WITHOUT ERROR

     FORMULA:  388/281+282+283+284+287

                             MEAN      SIGMA          RANGE           N
ID = 09374     MATH           .69        .25      0.00 -  1.00        53
               ENGLISH        .77        .22      0.00 -  1.00        74

SERIOUS MISBEHAVIORS FOR WHICH TEACHER MADE A TARGET ERROR

     FORMULA:  389/281+282+283+284+287

                             MEAN      SIGMA          RANGE           N
ID = 09375     MATH           .03        .07      0.00 -   .33        53
               ENGLISH        .02        .05      0.00 -   .33        74

SERIOUS MISBEHAVIORS FOR WHICH TEACHER MADE A TIMING ERROR

     FORMULA:  390/281+282+283+284+287

                             MEAN      SIGMA          RANGE           N
ID = 09376     MATH           .11        .18      0.00 -  1.00        53
               ENGLISH        .06        .10      0.00 -   .47        74

SERIOUS MISBEHAVIORS TO WHICH TEACHER OVERREACTED

     FORMULA:  391/281+282+283+284+287

                             MEAN      SIGMA          RANGE           N
ID = 09377     MATH           .03        .14      0.00 -  1.00        53
               ENGLISH        .01        .03      0.00 -   .22        74

TEACHER INITIATED CONTACTS WHICH WERE SOCIAL

     FORMULA:  339/339+340

                             MEAN      SIGMA          RANGE           N
ID = 09378     MATH           .24        .19      0.00 -  1.00        56
               ENGLISH        .26        .19      0.00 -   .75        77

STUDENT CREATED CONTACTS WHICH WERE SOCIAL

     FORMULA:  340/339+340

                             MEAN      SIGMA          RANGE           N
ID = 09379     MATH           .76        .19      0.00 -  1.00        56
               ENGLISH        .74        .19       .25 -  1.00        77
```

Table 3.2 (cont.)

STUDENT CREATED SOCIAL CONTACTS WHICH TEACHER ACCEPTED

FORMULA: 341/240

		MEAN	SIGMA	RANGE	N
ID = 093A0	MATH	.92	.10	.50 - 1.00	55
	ENGLISH	.94	.08	.67 - 1.00	77

STUDENT CREATED SOCIAL CONTACTS WHICH TEACHER DID NOT ACCEPT

FORMULA: 342/340

		MEAN	SIGMA	RANGE	N
ID = 093A1	MATH	.08	.10	0.00 - .50	55
	ENGLISH	.06	.08	0.00 - .33	77

RESPONSE OPPORTUNITIES IN WHICH TEACHER PRAISED

FORMULA: 79+80+81+82/1+2+3+4

		MEAN	SIGMA	RANGE	N
ID = 093A2	MATH	.09	.08	0.00 - .33	56
	ENGLISH	.11	.10	0.00 - .43	78

RESPONSE OPPORTUNITIES IN WHICH TEACHER CRITICIZED

FORMULA: 83+84+85+86/1+2+3+4

		MEAN	SIGMA	RANGE	N
ID = 093A3	MATH	.01	.01	0.00 - .03	56
	ENGLISH	.00	.01	0.00 - .05	78

DYADIC CONTACTS WHICH WERE RESPONSE OPPORTUNITIES

FORMULA: 1+2+3+4/Tot Dyad

		MEAN	SIGMA	RANGE	N
ID = 093A4	MATH	.27	.16	.02 - .70	56
	ENGLISH	.29	.16	.03 - .66	78

DYADIC CONTACTS WHICH WERE STUDENT INITIATED QUESTIONS

FORMULA: 200/Tot Dyad

		MEAN	SIGMA	RANGE	N
ID = 093A5	MATH	.08	.05	.01 - .20	56
	ENGLISH	.07	.04	.01 - .22	78

Table 3.2 (cont.)

```
DYADIC CONTACTS WHICH WERE: STUDENT INITIATED COMMENTS

      FORMULA:  201/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04386      MATH             .03        .02     0.00 -   .10       56
                ENGLISH          .04        .03      .00 -   .16       78

DYADIC CONTACTS WHICH WERE: STUDENT CREATED (PRIVATE)

      FORMULA:  247+248+256+340/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04387      MATH             .30        .13      .15 -   .75       56
                ENGLISH          .34        .12      .10 -   .69       78

DYADIC CONTACTS WHICH WERE: TEACHER INITIATED (PRIVATE)

      FORMULA:  264+276+339/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04388      MATH             .13        .05      .04 -   .40       56
                ENGLISH          .15        .06      .03 -   .39       78

DYADIC CONTACTS WHICH WERE: BEHAVIOR RELATED

      FORMULA:  277+278+...+289/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04389      MATH             .11        .06      .00 -   .31       56
                ENGLISH          .12        .06      .01 -   .30       78

DYADIC CONTACTS WHICH WERE: SOCIAL

      FORMULA:  339+340/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04390      MATH             .03        .02      .00 -   .10       56
                ENGLISH          .04        .04     0.00 -   .21       78

DYADIC CONTACTS WHICH WERE: PRIVATE (NOT PUBLIC RESPONSE OPPORTUNITY)

      FORMULA:  247+248+256+264+276+339+340/Tot Dyad

                                MEAN      SIGMA        RANGE            N
ID = 04391      MATH             .51        .15      .22 -   .83       56
                ENGLISH          .49        .15      .16 -   .81       78
```

Table 3.2 (cont.)

```
PRIVATE DYADIC CONTACTS WHICH WERE STUDENT CREATED (NOT SOCIAL)

       FORMULA:  247+248+256/247+248+256+264+276

                                 MEAN      SIGMA           RANGE            N
ID = 09392     MATH               .75        .11       .06 -    .94        56
               ENGLISH            .69        .10       .41 -    .89        78

PRIVATE ACADEMIC RELATED CONTACTS WHICH TEACHER PRAISED

       FORMULA:  249+265/247+264

                                 MEAN      SIGMA           RANGE            N
ID = 09393     MATH               .02        .02      0.00 -    .13        56
               ENGLISH            .03        .03      0.00 -    .16        78

PRIVATE ACADEMIC RELATED CONTACTS WHICH TEACHER CRITICIZED

       FORMULA:  250+266/247+264

                                 MEAN      SIGMA           RANGE            N
ID = 09394     MATH               .03        .03      0.00 -    .13        56
               ENGLISH            .03        .04      0.00 -    .18        78

PRIVATE ACADEMIC CONTACTS

       FORMULA:  247+264/247+248+256+264+339+340+276

                                 MEAN      SIGMA           RANGE            N
ID = 09395     MATH               .63        .12       .27 -    .84        56
               ENGLISH            .52        .14       .17 -    .74        78

PRIVATE NON-ACADEMIC CONTACTS

       FORMULA:  248+256+276+339+340/247+248+256+264+339+276+340

                                 MEAN      SIGMA           RANGE            N
ID = 09396     MATH               .37        .12       .16 -    .73        56
               ENGLISH            .48        .14       .26 -    .83        78

STUDENT CREATED PUBLIC CONTACTS

       FORMULA:  200+201/200+201+247+248+256+340

                                 MEAN      SIGMA           RANGE            N
ID = 09397     MATH               .23        .12       .04 -    .51        56
               ENGLISH            .25        .13       .02 -    .57        78
```

Table 3.2 (cont.)

```
TEACHER INITIATED PUBLIC CONTACTS (EXCLUDING BEHAVIOR)

        FORMULA:  1+2+3+4/1+2+3+4+264+276+339

                                MEAN      SIGMA          RANGE           N
ID # 00398     MATH             .62        .22       .05 -   .91        56
               ENGLISH          .62        .21       .16 -   .95        78

STUDENT CREATED PRIVATE ACADEMIC CONTACTS

        FORMULA:  247/247+248+256+340

                                MEAN      SIGMA          RANGE           N
ID # 00399     MATH             .69        .12       .28 -   .84        56
               ENGLISH          .51        .14       .13 -   .80        78

STUDENT CREATED PRIVATE PROCEDURAL CONTACTS

        FORMULA:  248/284+276

                                MEAN      SIGMA          RANGE           N
ID # 00400     MATH             .67        .12       .35 -   .88        56
               ENGLISH          .65        .18       .44 -   .85        78

ALL ACADEMIC CONTACTS WHICH RECEIVED PROCESS FEEDBACK

        FORMULA:  28+37+46+208+218+230+214+255+271/1+2+3+4+200+201+247+264

                                MEAN      SIGMA          RANGE           N
ID # 00401     MATH             .26        .09       .11 -   .46        56
               ENGLISH          .14        .08       .02 -   .40        78

TEACHER INITIATED BEHAVIOR RELATED CONTACTS

        FORMULA:  277+...289/277+...+289+264+276+339

                                MEAN      SIGMA          RANGE           N
ID # 00402     MATH             .46        .18       .05 -   .76        56
               ENGLISH          .40        .15       .18 -   .75        78
```

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Table 3.3: Summary of Important Results: Relationships Between Low-inference Process Variables and Student Achievement

Table 3.3 contains those results which were judged to be both practically and statistically significant, and which were discussed in the text of the chapter. Criteria for inclusion in the chapter and summary table are discussed on pages 93 and 94.

The table is divided into sections, as follows:

Section	Pages
1. Use of time in the classroom	266
2. Public contacts between the teacher and students	
a. Academic response opportunities	266
Types of questions	266
Selection of respondents	267
Quality of responses	267
Feedback following student responses	268
b. Student initiated questions and comments	269
3. Private contacts between the teacher and students	271
4. Behavior-related contacts between the teacher and students	273
5. Social contacts between the teacher and students	276

The symbols used in the tables are as follows:

n.s. = not significant. There was no statistically significant relationship between the classroom behavior and achievement gains in that subject.

+ = positive relationship. There was a significant positive association between the classroom behavior and achievement gains in that subject.

- = negative relationship. There was a significant negative association between that classroom behavior and achievement gains in that subject.

I = interaction. The relationship between the classroom behavior and achievement gains in that subject was significantly different for low and high ability classes.

When there is an interaction, the separate relationships for low and high ability classes are listed in the adjacent columns. A + or - (without parentheses) indicates that the slope of the regression line for that variance and ability level exceeded our criterion for practical significance (.40 A-score units difference in adjusted gain for high and low levels of the behavior). A (+) or (-) (in parentheses) indicates that the slope of the regression line did not exceed our criterion for practical significance.

Results for both math and English, and for both rate and proportion variables, are listed together in each section. At the end of each section is a list of variables that were related to achievement in a statistically significant manner but not discussed separately in the text. Additional information on those variables is available in Tables 3.1 and 3.2, and in the Tables in Volume II.

Table 3.3: Summary of Important Results: Relationships Between Low-inference Process Variables and Student Achievement

	Interactions (Math)		Main Effects		Interactions (English)	
USE OF TIME IN THE CLASSROOM (1.)	Low	High	Math	English	Low	High
15366 Minutes in individual seatwork			-	ns		
15370 Minutes in lecture demonstration	(-)	+	+,I	ns		
Statistically significant results not discussed in the text:						
Math: 15381 English: 15378, 15381						
PUBLIC CONTACTS BETWEEN THE TEACHER AND STUDENTS (2.)						
Academic response opportunities (2.a.)						
15001 Response opportunities generated by process questions			+	I	+	0
15002 Response opportunities generated by product questions			+	ns		
15019 Correct answers			+	ns		
15020 Incorrect answers			+	ns		
15393 Public response opportunities			+	ns		
09384 Dyadic contacts which were response opportunities			+	ns		
Types of questions						
09001 Response opportunities generated by process questions			+	ns		
09002 Response opportunities generated by product questions			-	ns		
Statistically significant results not discussed in the text:						
English: 15003						

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Selection of respondents (2.a.) cont.	Low	High	Math	English	Low	High
09012 Response opportunities given to volunteers			+	I	(+)	(-)
09013 Response opportunites answered by students calling out			ns	I	(-)	(+)
09072 Product questions directed to volunteers			+	ns		
09075 Process questions answered by students calling out	(-)	+	I	ns		
09076 Product questions answered by students calling out			ns	I	-	(+)
09203 Correct answers given by volunteers			+	ns		
09206 Incorrect answers given by preselected nonpatterned turn students			+	ns		
09207 Incorrect answers given by nonvolunteers			-	ns		
09208 Incorrect answers given by volunteers			+	ns		
09209 Incorrect answers given by students who called out	(-)	+	I	ns		
Statistically significant results not discussed:						
Math: 15010, 15012 English: 09063, 09073, 09204, 09211						
Quality of responses						
09022 Answers which were no response			-	ns		
09056 Process questions to which students gave no response			-	ns		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Selection of respondents *(2.a.) cont.*	Low	High	Math	English	Low	High
Statisically significant results not discussed:						
Math: 09052, 15005, 15006, 15021, 15050, 15052, 15053, 15056 English: 09053, 09055, 09127, 09132, 09135, 15005, 15007, 15050, 15053						
Feedback following student responses						
09023 Correct answers which teacher praised			+	+		
09080 Answers to product questions which teacher praised			+	ns		
09142 Nonvolunteers whom teacher praised			+	ns		
09144 Call-out students whom teacher praised			ns	+		
09382 Response opportunities in which teacher praised			+	+		
09383 Response opportunities in which teacher criticized			ns	ns		
15081 Answers to choice questions which teacher praised			ns	+,I	+	(-)
15143 Volunteers whom teacher praised			+	+		
Statistically significant results not discussed:						
Math: 09027, 09032, 09035, 09039, 09041, 09046, 09092, 09099, 09120, 09182, 15023, 15024, 05026, 15035, 15041, 15044, 15079, 15080, 15141, 15142, 15144, 15183, 15395, 15399						
English: 09028, 09030, 09036, 09039, 09082, 09088, 09107, 09112, 09113, 09114, 09121, 09125, 09159, 09168, 09184, 09185, 09189, 09192, 15027, 15029, 15091, 15107, 15115, 15119, 15121, 15122, 15184						

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Student initiated questions and comments (2.b.)	Low	High	Math	English	Low	High
09219 Student initiated called out questions which were relevant			ns	I	(+)	(-)
09226 Student initiated called out questions which were irrelevant	(+)	-	I	ns		
09227 Student initiated irrelevant questions called out and ignored	(+)	-	I	ns		
09229 Student initiated irrelevant questions called out and given feedback	(+)	-	I	ns		
09235 Student initiated relevant questions which were redirected			+	ns		
09236 Student initiated relevant questions integrated into class discussion			+	ns		
09239 Student initiated comments which were called out	(+)	(-)	I	ns		
09240 Student initiated relevant comments which were called out			ns	I	(+)	-
09245 Student initiated relevant comments called out and given feedback			+	I	(+)	-
09247 Student initiated relevant comments called out and integrated into discussion			+	ns		
09248 Student initiated irrelevant comments which were called out	(+)	-	I	ns		
09250 Student initiated irrelevant comments called out and ignored	(+)	(-)	I	ns		
09252 Student initiated irrelevant comments called out and given feedback	(+)	-	I	ns		
09385 Dyadic contacts which were student initiated questions			+	ns		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Student initiated questions and comments (2.b.) cont.	Low	High	Math	English	Low	High
09397 Student created public contacts			+	I	(+)	(-)
15200 Student initiated questions and comments which were questions			+	ns		
15201 Student initiated questions and comments which were comments			+	ns		
15210 Student initiated called-out questions which were irrelevant	(+)	(-)	I	ns		
15213 Student initiated irrelevant questions called out and given feedback	+	(-)	I	ns		
15223 Student initiated comments which were called out			ns	I	(+)	(-)
15224 Student initiated relevant comments which were called out			+	I	+	(-)
15232 Student initiated irrelevant comments which were called out	+	(-)	I	ns		
15235 Student initiated irrelevant comments called out and not accepted	(+)	(-)	I	ns		
15236 Student initiated irrelevant comments called out and given feedback	(+)	(-)	I	ns		
15413 Student initiated questions and comments			+	ns		

Statistically significant results not discussed:

Math: 09221, 09233, 09238, 09254, 15202, 15203, 15207, 15208, 15214, 15215, 15217, 15218, 15219, 15220, 15222, 15225, 15229, 15230, 15231, 15400

English: 09238, 09242, 09244, 09255, 09260, 15219, 15220, 15222, 15226, 15229, 15244

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
***PRIVATE CONTACTS BETWEEN THE TEACHER AND STUDENTS** (3.)*	Low	High	Math	English	Low	High
09267 Student created contacts related to academic content			ns	I	(-)	(+)
09271 Student created academic related contacts involving brief teacher contact			+	ns		
09272 Student created academic related contacts involving long teacher contact			-	ns		
09274 Student created academic related contacts given simple feedback			+	ns		
09275 Student created academic related contacts given process feedback			-	ns		
09276 Student created contacts which involved personal requests	+	(-)	I	ns		
09277 Student created personal contacts which teacher granted	(-)	-	-,I	ns		
09279 Student created personal contacts which teacher did not grant	(+)	+	+,I	ns		
09280 Student created content related contacts given brief feedback			+	ns		
09281 Student created content related contacts given brief process feedback			+	ns		
09283 Student created content related contacts given long process feedback			-	ns		
09284 Teacher initiated contacts which were academic related	-	(+)	I	I	(-)	(+)
09286 Teacher initiated academic contacts which involved criticism			ns	-		
09288 Teacher initiated academic contacts which were long			-	ns		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
PRIVATE CONTACTS BETWEEN THE TEACHER AND STUDENTS (3.) cont.	Low	High	Math	English	Low	High
09293 Teacher initiated academic contacts which involved brief process feedback			+	ns		
09295 Teacher initiated academic contacts which involved long process feedback			-	ns		
09296 Teacher initiated contacts which related to classroom procedure	+	(-)	I	ns		
09387 Dyadic contacts which were student created (private)			-	ns		
09388 Dyadic contacts which were teacher initiated (private)			ns	I	(-)	(+)
09391 Dyadic contacts which were private (not public response opportunity)			-	ns		
09395 Private academic contacts			ns	I	(-)	(+)
09396 Private nonacademic contacts			ns	I	(+)	(-)
15252 Student created academic related contacts involving long teacher contact			-	ns		
15256 Student created contacts which involved personal request	(+)	-	-,I	ns		
15257 Student created personal contacts which teacher granted	(+)	-	-,I	ns		
15263 Student created content related contacts given long process feedback			-	ns		
15264 Teacher initiated contacts which were academic related			ns	I	(-)	(+)
15411 Private student created contacts			ns	ns		
15412 Private teacher initiated contacts			ns	ns		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
PRIVATE CONTACTS BETWEEN THE TEACHER AND STUDENTS (3.) cont.	Low	High	Math	English	Low	High
Statistically significant results not discussed:						
Math: 09285, 09291, 15261, 15400 English: 09278, 09285, 09399, 15265, 15268, 15271, 15274, 15275						
BEHAVIOR-RELATED CONTACTS BETWEEN THE TEACHER AND STUDENTS (4.)						
09305 Misbehaviors involving students leaving class without permission			ns	-		
09307 Misbehaviors involving students baiting teacher			ns	-		
09313 Misbehaviors which involved management request from teacher (no error)			+	ns		
09314 Management request after misbehavior directed to wrong student (target error)			-	+		
09321 Misbehaviors in which teacher threatened student	+	(-)	I	I	(+)	(-)
09323 Misbehaviors in which teacher overreacted with threat			ns	I	+	(-)
09330 Mild misbehaviors where teacher threatened student			ns	+,I	+	(-)
09331 Socializing misbehaviors in which teacher intervened nonverbally			ns	I	(-)	(+)
09332 Socializing misbehaviors involving a management request			+	ns		
09334 Socializing misbehaviors in which teacher threatened student			ns	I	(+)	(-)
09338 Disruptive misbehaviors in which teacher intervened nonverbally			ns	I	(-)	+

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
BEHAVIOR-RELATED CONTACTS BETWEEN THE TEACHER AND STUDENTS *(4.) cont.*	Low	High	Math	English	Low	High
09342 Defiance of teacher responded to with a management request	(-)	+	I	ns		
09345 Student verbal aggression handled by a management request	-	+	I	ns		
09347 Student physical aggression handled by a management request			+	ns		
09348 Student physical aggression which teacher criticized			-	ns		
09354 Student baits teacher and teacher handles with management request	-	+	I	ns		
09359 Misbehaviors which involved management request			+	ns		
09361 Misbehaviors in which teacher threatened student	+	(-)	I	+,I	+	(-)
09363 Misbehaviors in which teacher acted with target error			-	+		
09366 Mild misbehaviors involving management request			+	ns		
09367 Mild misbehaviors involving teacher criticism			ns	I	(+)	(-)
09375 Serious misbehaviors for which teacher made a target error			-	ns		
09389 Dyadic contacts which were behavior related			ns	-		
15282 Misbehaviors during which students sassed or defied teacher			ns	-		
5285 Misbehaviors involving students leaving class without permission			ns	-		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
***BEHAVIOR-RELATED CONTACTS BETWEEN THE TEACHER AND STUDENTS** (4.) cont.*	Low	High	Math	English	Low	High
15287 Misbehaviors involving students baiting teacher			ns	-		
15292 Misbehaviors in which teacher intervened nonverbally			ns	I	(-)	(+)
15293 Misbehaviors which involved management request from teacher			ns	-		
15294 Management request after misbehavior directed to wrong student (target error)			-	ns		
15297 Misbehaviors which teacher criticized			-	ns		
15307 Mild misbehaviors where teacher intervened nonverbally			ns	I	(-)	(+)
15311 Socializing misbehaviors in which teacher intervened nonverbally			ns	I	(-)	(+)
15316 Misbehaviors involving tardiness which teacher criticized	(-)	-	I	ns		
15322 Defiance of teacher responded to with a management request			ns	-		
15324 Defiance of teacher responded to with teacher threatening student			ns	I	(-)	(+)
15328 Student physical aggression which teacher criticized			-	ns		
15334 Student baits teacher and teacher handles with management request			ns	-		
15338 Misbehaviors not in above categories which teacher criticized	(+)	(-)	I	ns		
15388 Serious misbehaviors which teacher handled without error			ns	-		

Table 3.3 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
***BEHAVIOR-RELATED CONTACTS BETWEEN THE TEACHER AND STUDENTS** (4.) cont.*						
15389 Serious misbehaviors for which teacher made a target error			-	ns		
15404 Behavioral criticism			-	ns		
15408 Serious misbehaviors			ns	-		
Statistically significant results not discussed:						
Math: 09300, 09315, 09322, 15280 English: 09306, 09371, 09376						
***SOCIAL CONTACTS BETWEEN THE TEACHER AND STUDENTS** (5.)*						
09380 Student created social contacts which teacher accepted			ns	I	(+)	(-)
09381 Student created social contacts which teacher did not accept			ns	I	(-)	(+)
09390 Dyadic contacts which were social			ns	I	(+)	(-)
15340 Student created contacts which were social			ns	I	+	(-)
15341 Student created social contacts which were accepted			ns	I	+	(-)
15402 Social contacts			ns	I	(+)	(-)

Chapter 4: Relations of High- and Low-inference Measures with Student Attitudes

At the same time as students were given their achievement tests, they also completed nine 5-point scales describing their attitudes toward the teacher and class. A factor analysis of these scales produced one factor (04010) describing the student's overall positive or negative evaluation of the teacher. As discussed in Chapter 2, this factor score was positively related to student achievement gains in math, but was interactively related in English (positive for high ability classes, negative for low).

This factor score describing student attitude was used as a criterion measure in the same way as the achievement scores. That is, each of the high-and low-inference variables was compared to the attitude factor as a criterion, using class averages. The class average entering CAT score was used as a covariable to control for systematic differences in student attitudes which were related to the students' entering ability. However, the effects of CAT on attitude were not great. Although the entering CAT scores were very good predictors of achievement test scores, accounting for about 71% and 85% of the variance in math and English achievement test scores, respectively, they were very poor predictors of student attitude scores, accounting for only about 5% of the variance in both math and English. Since the entering CAT scores also serve, in a very rough way, as proxy variables for the socio-economic status and ethnic composition of the class, it seems that these factors were responsible for only a small part of the variance in student scores.

Volume III contains tables showing the relationship of each classroom process measure to student attitudes. These data will be discussed in this chapter. Results will be presented first for math, then for English. Within each subject, they will be presented in the following order:

- I. High-Inference Measures
  - A. Classroom Observation Scales
  - B. Observers' Ratings of Teachers' Methods and Practices
  - C. Observers' Ratings of Target Students
  - D. Teachers' Ratings of Target Students
  - E. Observers' Classroom Descriptions
- II. Low-Inference Measures (Rates and Proportions)
  - A. Use of Time in the Classroom
  - B. Public Contacts between the Teacher and Students
    - 1. Academic response opportunities
      - Types of questions
      - Selection of respondents
      - Quality of responses
      - Feedback following student responses
    - 2. Student initiated questions and comments
  - C. Private Contacts between the Teacher and Students
  - D. Behavior Related Contacts between the Teacher and Students
  - E. Social Contacts between the Teacher and Students
- III. Summary and Discussion

There are more than 750 variables in all, and tests were conducted to determine both main effect and interactive relationships with attitude in both math and English. Thus, this chapter contains a summary of the results of more than 3,000 F-tests. A great many of these results were significant, especially for math. In order to keep the discussion to a reasonable length, we will emphasize meaningful patterns rather than individual results. Summary tables are provided at the end of this chapter. Readers who wish to examine the results in greater detail are referred to the tables in Volume III.

A great deal of information which is relevant to the interpretation of the results presented in this chapter has already been discussed in previous chapters, including the following:

1. Instruments and methodology (Chapter 1 and appendices)
2. The reliability and distribution statistics of the variables (Chapters 2 and 3)
3. Method of statistical analysis (Chapter 1)

Math

I. High Inference Measures

The data from the high inference measures (rating scales) yielded a great many significant results, mostly positive. There are so many, in fact, that a "halo effect" may be responsible for some of the results. Observers who rated a teacher high on one scale tended to rate that teacher high on other scales as well. It is also true, of course, that the good teachers did many different things well, and many of the scales measured similar attributes. It is clear from the high inference measures that there was substantial agreement between the observers and the students about which math teachers were "good" and which were not. Teachers who were rated highly by the observers tended to be rated highly by their students as well.

Results for each of the high inference data sets will be discussed on the following pages. Summary tables with significant results are at the end of the chapter, and complete results for each high inference variable can be found in Volume III, pages 1-43.

A. *Classroom Observation Scales*. Positive relationships with student attitudes were found for 11 of the 15 Classroom Observation Scales and three of the four factors. One scale and one factor score were negatively related to student attitudes. Only three of the scales were unrelated to student attitudes. Positive relationships with attitudes were found for the following factor scores:

01020, Factor 1: Attention, clarity, activity
01021, Factor 2: Positive affect, enthusiasm
01022, Factor 3: Questioning, evaluation

With the exception of negative affect (01005), the individual scale scores that composed these factors were also related positively to student attitudes. Factor 4: Pupil interaction/teacher presentation (01023) was negatively associated with student attitudes, however. This means that students preferred teachers who presented information themselves and did not allow large amounts of pupil-to-pupil interaction.

Thus, the students preferred math teachers who dominated their classes, spending lots of time in class discussion, presenting information themselves, and asking many questions. They preferred for their teachers to be cheerful and enthusiastic, and teachers who were rated by the observers as giving clear presentations were also highly rated by the students. Teachers who were rated as being highly task oriented (01010) were highly rated by their students.

The variables in this subset were also strongly associated with student achievement gains, and the pattern of results was about the same, although it was not quite as strong. Therefore, the practices which made teachers popular with their students also tended to help their students learn math. It appears from the data in this subset that the students were fairly good judges of how much they were learning in their math classes, and that the academic effectiveness of the teacher played an important role in their overall evaluation of the teacher.

B. *Observers' Ratings of Teachers' Methods and Practices*. Thirty-five of the 64 individual scale scores and all four factor scores in this subset showed positive relationships with student attitudes. Nine other scale scores were negatively related with student attitudes. There were only two interactions (02032, 02060). Both of these were associated with positive main effects, and they will not be discussed separately. Twenty scale scores were not associated with student attitudes.

As with the data from the classroom observation scales, the attitude and achievement data formed very similar patterns. There were 22 variables that were positively related to both achievement and attitude and five variables that were negatively related to both achievement and attitude. There were no variables that showed a significant relationship in one direction for achievement and in the other direction for attitude. All four factor scores were positively associated with both achievement and attitude. Once again, it is clear that students give higher ratings to academically effective math teachers.

There were, however, a number of interesting differences between the individual scale scores that were significantly related to achievement and those that were significantly related to attitudes. The individual scales will be divided into four groups and discussed separately. Each group of scale scores is associated statistically or logically with one of the four factor scores.

The first factor contained a number of variables that were connected with the effectiveness of the teacher's organization and control (02065). Students both liked and benefitted from being in classes where the teacher was well organized and efficient. The following variables were significantly related to both student attitudes and achievement, in the directions indicated:

02033, Effectiveness of teachers' management methods (+)

02008, Student obedience to teacher (+)

02010, Classroom interruptions (-)

02014, Consistency of enforcement of rules (+)

02016, Length of time after bell for class to begin (-)

02022, Efficiency of transitions during class period (+)

It appears, however, that disruptions affected student learning more strongly than they affected student attitudes. The following variables were significantly related to achievement only, in the directions indicated:

02013, Frequency of seating arrangement changes (-)

02015, Teacher grants requests to go to restroom or water fountain (-)

02018, Amount of disturbance teacher accepts (-)

02021, Monitoring of class (+)

It becomes evident that students appreciated math teachers who were well organized, and they tolerated teachers who were strict. Variables associated with both organization and strictness were positively related to achievement in math.

Factor 2 (02066) included a set of variables connected with affective characteristics of the teacher: orientation to students' personal needs and solidarity with the class group. This factor is positively associated with achievement, but only marginally ($\underline{p} = .04$). The positive association with student attitudes, on the other hand, is very strong (R^2 drop = .37, $\underline{p} < .0001$). The following associated variables were positively related to both attitude and achievement:

02029, Teacher enthusiasm

02030, Student respect for teacher

02031, Teacher deals effectively with personal problems

02036, Academic encouragement given by teacher

02037, Receptiveness to student input

02056, Teacher concern for academic achievement, grades

All of these variables were associated more strongly with student attitudes than with achievement. There were many other variables in this group that were significantly positively associated with student attitudes, but not achievement; most were associated with the teacher's affection and nurturance of the students (02023, 02024, 02025, 02026, 02032, 02038, 02047). Thus, the teacher's affective traits are related much more strongly to student attitudes than to student math achievement.

The third factor score (02067) included scales describing the teacher's choice of methods and assignments. The pattern of results was almost exactly the same for both attitude and achievement. The following variables were significantly associated with both attitude and achievement in the directions indicated:

02039, Variety and choice in assignments (-)

02040, Teacher use of self-paced work (-)

02041, Teacher use of blackboard for lectures and discussions (+)

02048, Time allotted for class discussion (+)

02058, Teacher primarily assigns seatwork (-)

02059, Teacher primarily uses class discussions (+)

02054, Amount of class time spent in productive work (+)

Thus, students neither like nor learned well from teachers who assigned excessive amounts of seatwork or self-paced work, or gave their students many choices about what to do. They preferred math classes where the teacher led discussions of the class as a whole, and students in those classes apparently learned more math. Several variables that were significantly associated with student attitudes alone (02049, 02053, 02057, 02062) do not significantly add to the pattern presented above. The results for variable 02053, "frequency of homework," are interesting in that they indicate that the students preferred teachers who assigned more homework, although the distribution of scores on this variable indicates that assigning homework was a relatively infrequent practice.

The final factor (02069) loaded heavily on a number of scales that had to do with the observers' judgments of the teachers' competence and confidence. This factor, like the second factor, was only weakly associated with achievement gains ($\underline{p} = .03$), but was very strongly associated with student attitudes (R^2 drop = .32, $\underline{p} < .0001$). A few of the scales associated with this factor were positively associated with both achievement and attitude including those describing the teacher's general confidence level (02028), academic effectiveness (02052), and credibility (02034). Most of the scales were significantly related to student attitudes only. Measures of the teacher's anxiety (02927) and awareness of the coder (02033) were negatively associated with student attitudes. Scales rating the teacher's preparation (02050), command of the subject matter (02060), ability to make productive use of his own mistakes (02045), and the observer's liking of the teacher (02064) were positively associated with student attitudes. Many of these relationships were among the strongest observed for any variables. Thus, it is again clear that the observers and the students liked the same teachers, and that the opinions of both were supported (but not particularly strongly) by the data on teacher effectiveness.

C. *Observers' Ratings of Target Students*. In addition to rating the teachers with the scales described above, the observers rated 12 randomly selected students from each class. These ratings were averaged for each class to give a general picture of the personalities and behavior of the students in that class. The observers' ratings of these target students correlated much less strongly with student attitudes toward the teacher than the observers' ratings of the teacher. Only six of the 29 variables in this subset were significantly related to student attitudes.

The connection of most of these significant results with the behavior of the teacher is readily apparent. Students tended to like the teacher in classes where there were more students rated as being constantly attended to by the teacher (03005), being highly motivated and eager (03009), and participating in class (03015). Students tended to rate teachers negatively in classes where many students were rated as lacking persistence (03014). It is to be expected that there might be differences on these variables in classes where the teacher shows concern for the students and provides them with interesting work appropriate to their level.

Two factor scores were also significantly related to student attitudes. Factor 2: Charisma (outgoing, sociable, happy) with peers and teachers (03027) was positively related to student attitudes. Factor 3: Physical, athletic development (03028) was negatively related to student attitudes. Neither relationship was particularly strong, and there were few significant correlations among the associated individual scale scores. It is possible that the students liked being in classes full of popular classmates and disliked being in classes full of "jocks." The meaning of these scores, however, is not very clear.

D. *Teachers' Ratings of Target Students*. The teachers rated the twelve target students in each of their classes on five scales. None of these teacher ratings was significantly associated with either student attitudes or achievement.

E. *Observers' Classroom Descriptions*. After each observation the observers wrote short, unstructured descriptions of what they had seen. At the end of the year, the descriptions for each class were pooled and rated on 31 scales which were derived from those descriptions.

The results follow closely the pattern already described for the first two subsets of high inference variables. There were nine variables that were positively associated with both achievement and attitude, and no variables that showed significant associations in one direction with student achievement and in the other direction with student attitudes. Twelve variables were significantly related to one of the two criteria, but not the other.

Teachers who were both academically effective and liked by their students were rated as being liked by the observers (11032), being in control of the class (11030), being respected by the students (11029), enjoying teaching (11015), encouraging student effort (11009), knowing the subject matter (11016), acknowledging student feelings (11020), maintaining warm feelings in the classroom (11005), and reacting positively to student feelings (11001).

The variables that were significantly related to student attitudes but not to achievement generally involved the teacher's response to the students' affective needs and the teacher's appearance of competence. They included the following:

11002, Teacher actively listens to students in reading, reciting, etc. (+)
11003, Teacher berates or puts down student in front of others (-)
11012, Teacher adjusts learning schedule to be flexible (+)
11027, Teacher seems prepared for class (+)

The variables that were significantly related to student achievement but not attitude generally involved classroom management or the teacher's choice of teaching methods. They include the following:

11004, When teacher makes a threat, it is followed out (+)
11006, Students cooperate with others and teacher (+)
11010, Teacher divides time and attention among all students (+)
11011, Teacher fills empty time with busy work (-)
11014, Teacher assigns learning tasks to match individual abilities/interests (-)
11023, Teacher encourages students to take responsibility for their own work (+)

11031, Time is spent in activities such as off-task talking, fooling around (-)

Thus, the picture that emerges from the classroom descriptions is virtually identical to that coming from the observers' ratings of the teachers. Students generally agreed with the observers about who the good teachers were, and the more effective teachers tended to be highly rated by both students and observers. The teachers' apparent concern for the students, preparation, and competence were very important to the students, but only weakly related to achievement gains. The teachers' management skills and emphasis on student behavior and responsibility were very important for academic effectiveness, but only weakly related to student attitudes. Individualized instruction seems to have been both unpopular and ineffective.

II. Low-inference Measures

The most important of our data sets were those generated by the low-inference coding system. The way that coding system was used and the way that the low-inference variables were generated has already been discussed in Chapters 1 and 3. The coding manual is available as Appendix C to this report. Complete results showing the relationship of each low-inference variable to student attitudes in math classes are in Volume III, pages 44-145 (proportion variables), and 146-217 (rate variables). The organization of variables for presentation will be the same for this chapter as for Chapter 3.

A. Teachers' use of time in the classroom. The following variables were related to student attitudes, in the directions indicated:

15370, Minutes in lecture-demonstration (+)

15371, Minutes in discussion (+)

15372, Minutes in drill (+)

15367, Minutes in transition (-)

15373, Minutes in special activities (-)

15374, Minutes in advance organizers (-)

15376, Minutes in individual self-paced work (-)

Variable 15366, "minutes in individual seatwork," which was negatively related to achievement, was also negatively related to attitude, but the relationship was not significant ($p = .11$). The students seemed to prefer classes where the teacher spent large amounts of time in class discussions and less time in other activities. The evidence for this preference is strongly supported by other results to be presented below.

B. Public contacts between the teacher and students. It is to be expected that teachers who spend more time leading class discussions should have more public contacts with their students. Therefore, it is not surprising that teachers who were highly rated by their students tended to have a greater proportion of public rather than private contacts (09397, 09398). Detailed results according to types of contacts are presented below.

1. Academic response opportunities. Whenever a student was given a chance to answer a teacher's question, it was coded as an academic response opportunity. The results for the high inference variables and the teachers' use of time in the classroom indicate that students preferred math classes where there was much public discussion and the teachers asked many questions. The data for academic response opportunities confirm this pattern. The following variables were positively associated with student attitudes:

09384, 15393, Public response opportunities

09398, Teacher initiated public contacts (excluding behavior)

15001, Response opportunities generated by process questions

15002, Response opportunities generated by product questions

15003, Response opportunities generated by choice questions

15019, Correct answers

15020, Incorrect answers

There were also 32 other rate variables which fell into the same pattern. In fact, virtually every rate variable that was associated with academic response opportunities and exhibited sufficient variance was positively related to student attitudes. This one pattern is so strong that it is impossible to use the rate variables for a more detailed analysis of students' preferences. We will, therefore, depend on the proportion variables for our analysis of students' preferences with regard to types of questions, selection of respondents, quality of responses, and feedback by the teacher.

It is worth noting that teachers who asked many public questions were not only popular, they were also effective. The strong pattern is very similar to the strong pattern of positive associations between rates of response opportunities and achievement gains discussed in Chapter 3.

Types of questions. We noted in Chapter 3 that the more effective teachers tended to ask a larger proportion of process questions and a smaller proportion of product questions. There was no such pattern when student attitudes were used as criterion. Students liked teachers who asked lots of questions, but they apparently did not care too much what kinds of questions the teachers asked. The only significant result among these variables was an interaction for variable 15004, "response opportunities generated by opinion questions." Low ability students preferred teachers who asked fewer opinion questions, while high ability students preferred teachers who asked more opinion questions. This result is based on low frequency data and is of doubtful validity.

Selection of respondents. The results presented in Chapter 3 indicated that the more effective teachers tended to rely more heavily on volunteers to answer their questions, while some teachers apparently depended too heavily on nonvolunteers. The use of preselection as an accountability device received some equivocal support.

When student attitudes were used as a criterion, the above results were not duplicated. The only clear pattern that emerged was that students disliked teachers who tolerated large numbers of call outs. The following variables were negatively related to student attitudes:

09013, Response opportunities which students answered by calling out
09078, Opinion questions answered by a student calling out
09204, Correct answers given by students who called out

It is of interest that the teachers who were rated lower by the students seemed to be those who tolerated call outs when the question was easy (09078, 09204). Thus, it seems that although call outs may sometimes be an indication of enthusiasm on the part of the students or a way of keeping the class moving, when they occur too often it may mean that the teacher is letting some students dominate the class at the expense of others. Students liked teachers who sometimes ignored called out answers (09179), although no teacher did this very often.

The only other significant results in this section were two uninterpretable interactions (09060, 09201).

Quality of responses. The only strong pattern observed with regard to the quality of student responses when achievement was used as the criterion was a negative relationship between achievement and the proportion of no response answers. This pattern was not duplicated when student attitudes were used as the criterion.

The relationships between student attitudes and quality of responses were dominated by a large number of interactions. Students in low ability classes liked teachers who asked questions easy enough so that a large number of answers were correct (09005, 09017, 09019). They downrated teachers who asked more questions that they could not answer ([illegible], 09050, 09051). Students in high ability classes, on the other hand, apparently liked teachers who challenged them with difficult questions. For high ability classes, the proportion of incorrect answers was positively related to student attitudes, but there was a negative relationship for correct answers.

These results coincide with our earlier work (Brophy & Evertson, 1976; Note 2; Crawford, Note 15) in which we found that low ability students tended to benefit from a slower pace with more repetition and a higher rate of correct answers, whereas higher ability students benefit from more challenging questions. Metz (1978) believes that lower ability students tend to be less confident in their academic abilities and less convinced of the value of what they are learning in school. They, therefore, tend to prefer work in which it is easy for them to be successful. Our present data provide no evidence that the proportion of correct answers is either positively or negatively related to learning in the range observed (averages of 59% to 92% correct), but they do indicate that the low ability students prefer teachers who ask more questions that they can answer correctly.

The only data in this section that do not fall into the above pattern concern choice questions. Students in classes of all ability levels tended to give higher ratings to teachers in whose classes a high proportion of choice questions were answered correctly (09007, 09052). Since choice questions are by nature easier to answer than other types, it is probable that teachers who had higher rates of incorrect answers to choice questions were using them as accountability devices or asking "trick" questions. These are unimportant results because teachers rarely asked choice questions in any case.

Teacher feedback to student responses. When achievement was used as the criterion, the many variables having to do with feedback following student response yielded largely uninterpretable results; the only important pattern was that teachers who used praise more often tended to have higher achievement gains.

The pattern with regard to praise was repeated when student attitudes were used as the criterion. Students preferred teachers who used academic praise more often (15395), and who praised a greater proportion of their answers (09382). The use of praise was also positively related to student attitudes in a variety of specific situations (09023, 09080, 09142, 09143, 09144).

The remainder of the results in this section seem to indicate that students are quite sensitive not only to actual praise and criticism, but also to unspoken evaluations which are implied by the form of the teacher's reactions to their responses. Students rated positively those teachers who followed their responses by asking a new question (09024, 09033, 09044, 09095, 09162, 09163), simplifying the question (09158), or integrating their answer into the class discussion (09035). A teacher who reacts in any of these ways has usually listened carefully to the student's response and is treating it with respect, whether it is correct or not.

Actual criticism of student responses was rare, and was not related to student attitudes. However, students did give poor ratings to teachers who repeated the question (09088, 09153, 09154), gave the answer (09115, 09188), followed a response with a nonacademic question (09025, 09100), or asked another student (09121). All of these forms of teacher feedback were more common than criticism, and all imply, not very subtly, that the teacher is not satisfied with the student's response. A number of interactions (09088, 09100, 09115, 09188, 15047) indicate that students in low ability classes were particularly sensitive to such implied put-downs.

2. Student initiated questions and comments. Given the students' strong preference for teachers who hold many class discussions, it might be expected that the rates of student initiated questions and comments would be positively associated with student attitudes, especially since those rates were positively associated with achievement. Surprisingly, this is not the case. The following variables were positively related to achievement, but were not significantly related to student attitudes:

15200, Student initiated questions and comments that were questions

15201, Student initiated questions and comments that were comments

15413, Student initiated questions and comments

There is a pattern of positive relationships between the variables in this subset and student attitudes, but it is much more limited than the pattern observed when achievement was used as the criterion. The following rate variables were positively related to student attitudes:

15208, Student initiated relevant questions called out and given process feedback

15214, Student initiated questions which were not called out

15215, Student initiated questions which were relevant

15217, Student initiated relevant questions which were given feedback

15218, Student initiated relevant questions given process feedback

15220, Student initiated relevant questions integrated into class discussion

15224, Student initiated relevant comments which were called out

15229, Student initiated relevant comments called out and given feedback

15230, Student initiated relevant comments called out and given process feedback

15231, Student initiated relevant comments called out and integrated into class discussion

15238, Student initiated relevant comments which were not called out

15241, Student initiated relevant comments given process feedback

15242, Student initiated relevant comments integrated into class discussion

There are three points worth noting about this set of variables. First, all twelve variables concern relevant rather than irrelevant questions and comments. Second, seven of the 12 variables concern questions and comments which were not called out, even though call outs were more common. Third, teachers who were positively rated by their students generally gave student initiated questions and comments the kind of respectful treatment which was seen to be positively related to student attitudes in the data on response opportunities.

Only five of the 45 proportion variables in the subset were significantly related to student attitudes, but they seem to fall into the patterns discussed above. Two variables (09223, 09228), indicate that students did not like classes where there are many call outs. The other three (09236, 09237, 09258) indicate that students liked their contributions to be treated with respect.

The contrast between the attitude and the achievement results for these variables is interesting. The achievement results indicate that the students did better in classes where the teachers encouraged a great deal of participation, even if questions and comments were sometimes called out or irrelevant. This was particularly true for low ability classes. The attitude results, while not contradictory, indicate that students liked teachers who dominated the class, asking most of the questions themselves and keeping tight controls over called out and irrelevant student contributions.

C. Private contacts between the teacher and students. We have already noted that the more popular teachers tended to spend more time in class discussions and have more public contacts with their students than the less popular teachers. It does not follow, however, that they had fewer private contacts with their students. In fact, neither the rate of private student initiated contacts (15411) nor the rate of private teacher initiated contacts (15412) was significantly related to student attitudes.

The more popular teachers simply had more contacts with their students, both teacher and student initiated (15393, 15401). A greater proportion of their contacts with their students was public rather than private (09387, 09388, 09391). The pattern here is the same for both attitude and achievement. The more academically effective teachers also tended to be more active, having more public contacts, more contacts overall, and about the same number of private contacts as less effective teachers.

When achievement was used as the criterion, the most important pattern involved the length of private contacts between teachers and students. Teachers who generally kept contacts brief tended to produce higher achievemand gain scores in their students. There is some evidence that students also preferred for teachers to give them brief process feedback (15273, 09281, 09293) and disliked long feedback during teacher initiated academic contacts (15274). This pattern is much less strong than the one for achievement, however, and there were far too many related variables that were not significantly associated with student attitudes for the above results to be discussed with confidence.

A much stronger pattern involved the types of interactions. Students liked classes where most of their private contacts with the teacher were academic in nature (09284, 09395) and disliked classes where there were many private procedural contacts (09268, 09296, 09396, 15248, 15276, 15401). Students expected their math teachers to be efficient and well organized, and large numbers of private procedural contacts were probably a sign that the teacher was disorganized or had failed to give sufficient instructions to the whole class.

The only other significant result among the variables in this section was an interaction (15270) which was probably spurious and will not be interpreted.

D. Behavioral contacts. The high-inference variables associated with classroom management were generally associated more strongly with achievement than with student attitudes. It appears that the consistent use of monitoring and accountability techniques may sometimes contribute to achievement, but generally is not strongly associated with student attitudes.

It is not too surprising, then, that low-inference variables involving misbehaviors and the teachers' ways of dealing with them are not strongly associated with student attitudes. There were few significant results for the variables in this section, and those results generally did not form consistent patterns.

Rates of behavioral contacts generally were not significantly associated with student attitudes, although students did tend to give lower ratings to teachers whose classes had high rates of verbal aggression (15283, 09303) and also downrated teachers who did not deal effectively with tardiness (15315).

Teachers who made large numbers of timing errors or target errors were generally less effective, and their students also tended to have more negative attitudes toward them (09315, 09372, 09375). Students in low ability classes generally gave higher ratings to teachers who were "with it" (Kounin, 1970) in the sense that they generally handled misbehaviors without error, but this pattern was not as strong for students in high ability classes (09362, 09370).

Metz (1978) noted that teachers in low ability classes tended to tolerate more mild "socializing" misbehaviors, but to react more strongly when students stepped seriously out of line. The data using achievement as the criterion gave some indication that this pattern might be associated with greater academic effectiveness. The present data indicate very weakly that students may also prefer teachers who react according to the above pattern. The following variables were related to student attitudes positively for low ability classes, and negatively for high ability classes.

15316, 09336, Misbehaviors involving tardiness which teacher criticized

09317, Misbehaviors which teacher criticized

09327, Mild misbehaviors where teacher intervened nonverbally

15279, Misbehaviors involving students socializing

15312, Socializing misbehaviors involving a management request

15384, Mild misbehaviors which teacher handled without error

15407, Mild misbehaviors

Academic effectiveness was generally associated with mild, rather than severe, reactions to misbehaviors. There is no evidence that the severity of the reactions affected student attitudes. The severest form of reaction, behavioral criticism, was associated positively with student attitudes on one variable (09358), and negatively on another (09340). Both were low frequency variables that were therefore probably unreliable.

The data involving student misbehaviors reveal few general trends. It appears that neither rates of misbehaviors nor the teachers' ways of dealing with them played a major role in determining a teacher's academic effectiveness or popularity. Furthermore, it appears that the "appropriate" response to student misbehavior depends on the type of student, the type of misbehavior, and other aspects of the specific situation. Our data indicate that it will be difficult or impossible to construct a simple set of general rules about how teachers should deal with behavior problems.

III. Summary

The picture that emerges of a "good" junior high math teacher is about the same whether student achievement test gains, student attitudes, or the observers' opinions are used as criteria. The more popular and academically more effective teachers were rated by the observers as having better classroom management, being better organized, enjoying teaching more, being better prepared, knowing their subject better, being more concerned about their students, being more respected by their students, and so forth. These data are useful in that they provide support for the general validity of our criterion measurements, but they do not enable us to make specific recommendations about appropriate teaching techniques or strategies in junior high school math classes.

However, the low inference classroom process data revealed a number of patterns that differentiated between successful and unsuccessful teachers in more specific ways. Whether achievement or attitude was used as the criterion, the successful teachers were found to emphasize class discussions, lectures and drill, and to spend less time using seatwork and individualized instructional techniques. The more successful teachers were highly task-oriented and businesslike in their instruction. This was especially true of the successful teachers of high ability classes; there was some evidence that students in low ability classes sometimes liked and benefitted from more tolerance and personal interest on the part of the teachers. The more successful teachers tended to be very much in charge of their classes, having more interactions with their students, especially during class discussions. The successful teachers also made more extensive use of public praise and generally treated their students' contributions to class discussions with respect. Although the more successful teachers were rated as being better classroom managers, our data indicate that appropriate ways of dealing with misbehaviors depended on many aspects of the specific situation.

There were differences in the results when achievement and attitude were used as criteria, but those differences mostly involved subtle details, rather than major trends. The use of monitoring and accountability techniques, for example, was more closely associated with achievement than with attitude, while a teacher's nurturance and affective skills were very important for student attitudes, but of marginal importance for achievement. Teachers who asked relatively more process questions were successful in inducing achievement gains, but there is no evidence that the types of questions affected student attitudes. Teachers who tolerated large numbers of call outs were rated lower by their students, but there is little evidence that this practice was actually harmful to achievement; it may even have been helpful in some situations. The way that teachers gave feedback to students who had answered questions had little effect on achievement, but there is evidence that students, especially low ability students, were quite sensitive to the ways in which teachers treated their contributions, and they gave lower ratings to teachers who intentionally or unintentionally "put down" students.

Overall, the data on junior high math classes form a consistent and reasonable picture. It is clear that teachers, students, and observers generally agreed about the purposes of junior high school math teaching, and that, whatever the criterion, a "good" teacher was described in similar ways.

English

There was a significant difference ($\underline{p} = .025$) between the average rating (04010) given by students to their English ($\bar{x} = 51.6$) and math ($\bar{x} = 48.3$) teachers (Evertson et al., Note 1). The English teachers tended to get higher ratings. The data from the English ratings, however, are not as satisfactory as the math data in describing reasonable process-outcome relationships. We have already noted that the achievement data do not form a particularly clear and consistent pattern, and that English achievement was unrelated to student attitudes. We shall see in looking at the attitude data that the students are less certain about what they want from their English teachers than they are about their math teachers.

I. High-inference Measures

In general, there were fewer significant results among the high-inference variables for English than for math, and the patterns of results tended to be different. The results for each subset are discussed below. The relationship of every high inference variable to student attitudes in English can be found in the Tables in Volume III, pages 218-259.

A. *Classroom Observation Scales.* None of the 19 Classroom Observation Scale variables was significantly related to achievement in English. Five of the individual scale scores (and one of the four factor scores) were significantly related to student attitudes. The significant results were as follows:

01004, Teacher presentation of academic information (+)
01005, Negative affect (teacher and students) (-)
01006, Positive affect (teacher) (+)
01008, Passive pupil behavior (-)
01012, Teacher enthusiasm (+)
01020, Factor 1: Attention, clarity, activity (+)

These results are noteworthy in two ways. First, there are not very many significant results (six, compared with 16 for the same variables in math). Second, four of the six significant results were concerned with affective aspects for the classroom, even though most of the variables in this subset are not affective in nature.

B. *Observers' Ratings of Teachers' Methods and Practices.* Only five of the 69 variables in this subset were significantly associated with achievement in English, and they did not form a coherent pattern. In contrast, there were 22 variables (20 individual scale scores and two factor scores) that were significantly related to student attitudes in English.

With these variables, as with those in the first subset, most of the significant results concerned affective characteristics of the teachers, rather than their choices of teaching methods. The two factor scores that were significantly associated with student attitudes were Factor 2: Orientation to students' personal needs, solidarity with group (02066) and Factor 5: Teacher competence, confidence (02069). The other three factor scores, which dealt with the teachers' choices of instructional methods and the quality of their classroom management, were not significantly associated with student attitudes in English.

Sixteen of the 20 significant results among the individual scale scores were for variables which were logically or statistically associated with the two factor scores discussed above. The remaining four significant results were as follows:

02009, Quantity of directions, overly explicit and repetitive (+)

02040, Teacher use of self-paced work (+)

09041, Teacher use of blackboard for lectures and discussions (+)

02057, Teacher primarily lectures (+)

Many other variables connected with the effectiveness of the teachers' management methods and the teachers' choices of instructional methods were not associated with student attitudes in English. These results seem to support two conclusions. First, it was less important to students that their English teachers be efficient and well organized than that their math teachers be efficient and well organized. Second, students preferred math teachers who used large amounts of lecture and class discussion, but we did not detect similar strong preferences with regards to methods of teaching English.

C. *Observers' Ratings of Target Students*. Sixteen of the 29 variables in this subset were significantly associated with English achievement, with the large number of interactions suggesting that an English teacher's academic effectiveness depended in a complicated manner on the types of students in the class. In contrast, only two variables were significantly related to student attitudes in English, as follows:

03017, Student has good relationship with teacher (+)

03029, Students with antisocial tendencies, emotional or behavioral problems (-)

Neither result is particularly surprising or deserving of discussion. The general lack of significant results seems to support the contention that student ratings of their teachers are not particularly dependent on the behavioral and personal characteristics of their classmates.

D. *Teachers' Ratings of Target Students*. The target students were rated by their teachers on five different scales. Three of these variables were related interactively with English achievement, again suggesting that the academic effectiveness of English teachers depends in a complicated manner on the characteristics of their students.

Four of the five scales were positively related to student attitudes, as follows:

05001, Student motivation, compared to rest of class

05002, Teacher would want the student in his/her class again

05003, Student academic performance, compared to rest of class

05005, Student displays appropriate behavior in class

As ratings of individual students, these variables were found to be reliable (Evertson et al., Note 1), but they are being used here as class average scores. We have a number of reasons to believe that they are not reliable indicators of "class average student characteristics," but rather that they are indicators of the "rating set" of the teacher. Some teachers, in other words, simply gave higher ratings to their students than others.

The students apparently liked those teachers who tended to give high average ratings. It could be that they liked teachers who liked them. It could also be that the teachers who gave higher ratings also gave higher grades, liked students better, were generally more optimistic, etc.

E. Observers' Classroom Descriptions. Five of the 31 variables in this subset were significantly related to English achievement scores, with no particular pattern being apparent. Eight of these variables were significantly associated with student attitudes in English. Two (11001, 11027) related interactively and are not easily interpreted. Four others (11005, 11016, 11023, 11029) were positively related, but not particularly interesting because the relationships were predictable and/or isolated. Two other relationships, however, deserve special discussion.

The first is a positive relationship for variable 11021, "teacher perceives student learning rates and adjusts learning pace." This variable is of interest because the relationship with student attitudes was quite strong (R^2 drop = .32. p = .004) and because it was negatively associated with student learning. This reinforces the pattern already observed, that student preferences in English were not necessarily affected by the teacher's choice of instructional methods or the effectiveness of those methods.

The second interesting variable is 11032, "observer's overall positive

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evaluation of the teacher." This and a similar variable, 02064, were positively related to student attitudes, but were unrelated to achievement. Thus, in English, as in math, the observers and the students tend to agree about who the good teachers are. In math, however, both the students' and the observers' ratings are supported by data from our achievement tests. In English, the teachers whom the observers and the students liked were not significantly more effective than those that they disliked.

II. Low-inference Measures

When the variables from the low-inference coding system were compared with achievement, the results were generally hard to interpret, with many interactions suggesting that the needs of high and low ability students were different in English classes. The predominance of interactions does not extend to the attitude data; instead, there is a predominance of negative associations. Complete results for each variable are presented in Volume III, pages 260-359 (proportion variables) and 360-430 (rate variables). The results are summarized below.

A. Teachers' use of time in the classroom. Our data suggested definite student feelings about how they wanted their math teachers to use their time. This is not true for English. Only two variables were significantly related to student attitudes in English (15264, 15381), and both concerned low-frequency events. Variable 15381, "number of peer tutoring situations," was interactively related to both attitude and achievement in English, with the direction of the interaction indicating that peer tutoring may be more appropriate for low ability classes. There was also a negative main effect when attitude was the criterion. This result is of doubtful validity, however, because peer tutoring was very rarely observed and because a closely related variable, 15362, "minutes in peer tutoring," was unrelated to either achievement or student attitudes.

B. *Public contacts between the teacher and students.*

1. *Academic response opportunities.* Variables indicating the presence of large amounts of class discussion and many public response opportunities were generally positively related to both attitude and achievement in math, and unrelated to English achievement. Many of those variables were *negatively* related to student attitudes in English. The following variables, for example, are positively related to math attitudes, but negatively related to English attitudes:

15393, Public response opportunities
09384, Dyadic contacts which were response opportunities
09397, Student created public contacts
15002, Response opportunities generated by product questions
15019, Correct answers
15020, Incorrect answers

The same pattern extended to 12 other variables (15005, 15012, 15031, 15032, 15033, 15037, 15039, 15045, 15051, 15397, 15399); all were positively related to student attitudes in math, negatively in English. It is obvious that these junior high school students expected very different things from their math and their English teachers.

The general pattern of negative associations between class discussions and student attitudes in English includes not only the variables listed above, but also 12 others (15009, 15025, 15030, 15034, 15036, 15039, 15052, 15084, 15107, 15116, 15120, 15147). The predominance of negative results makes interpretation of the rate variables difficult, but the contrast between the math and English results is instructive. The general pattern, which will be discussed in more detail in the following sections, seems to be this: students expect their math teachers to be demanding and to do a good job of teaching them math; they expect their English teachers to be nice and not to demand too much from them. Possible reasons for this pattern will be discussed in Chapter 5.

Types of questions. Teachers' choices of types of questions were unrelated to either achievement or student attitudes in English.

Selection of respondents. There was no reliable pattern of associations between English achievement and the ways that teachers selected respondents to their questions. There were, however, some interesting associations between student attitudes and the ways that English teachers selected respondents to their questions.

We have noted above that students did not like call outs in their math classes. However, three variables indicating the proportion of call outs were positively associated with student attitudes in English (09013, 09076, 09204, 09209). High rates of called out responses are generally indicative of a classroom atmosphere where teachers do not demand that their students always follow procedural rules.

The use of preselection (calling the student's name before asking the question) was associated interactively with student attitudes on six variables (09010, 09064, 09127, 09201, 09206, 09211). Students in low ability classes apparently liked teachers who used this method, while students in high ability classes disliked teachers who used it. This method of selection was very rarely used by most teachers.

The proportion of nonvolunteers who answered incorrectly (09129) was very strongly negatively associated with student attitudes (R^2 drop = .21, p = .0001). Most students definitely did not like teachers who made a practice of calling on students who had not volunteered and did not know the answer.

Quality of student responses. There were no consistent relationships between variables indicating the quality of student responses and achievement in English. Student attitudes in math were related interactively with variables indicating the proportions of correct and incorrect answers, with students in low ability classes indicating a preference for teachers in whose classes the proportion of correct answers was higher. It is possible that students who were less committed to academic achievement in math were more likely to react negatively to the embarrassment of giving an incorrect answer.

In English, the attitude results were similar for students at all ability levels. The proportion of correct answers was positively related to student attitudes (09006, 09019), and the proportion of incorrect answers was negatively related to student attitudes (09020, 09051, 09129). These results from the proportion variables are supported by the pattern of negative results among the rate variables. In spite of the fact that more than 80% of all observed responses were correct, there were 14 rate variables associated with incorrect answers and only three variables associated with correct answers among those that were negatively related to student attitudes.

This pattern of results is especially interesting in view of the fact that the proportion of incorrect answers was significantly lower in English classes than in math classes. The students in high ability math classes gave higher ratings to math teachers who asked many questions that they couldn't answer, but those same students (in many cases) gave lower ratings to English teachers who did the same thing. There are a number of possible explanations for this pattern of results, but one of the most likely, especially in view of the other results for English attitudes, is that the high ability students were not convinced that they benefitted from difficult questions in English classes. They were well aware that their math teachers were trying to help them learn difficult and important concepts and were thus willing to accept a relatively high pressure, teacher-dominated class. In English classes, however, they preferred a much lower level of pressure and demand.

Feedback following student reponses. The use of public praise was positively associated with achievement in both math and English, and with student attitudes in math. However, none of the variables associated with public praise was significantly related to student attitudes in English, either positively or negatively.

In fact, there are virtually no data to indicate how students liked teachers to react to their answers. Only two isolated variables in this section were positively related to student attitudes in English: 09172, "nonvolunteers whose answers were integrated into the class discussion," and 09182, "nonvolunteers whom teacher gave process feedback."

There was an abundance of data to suggest what the students did not like, however. They did not like teachers who offered more criticism (09030, 09084, 09147, 09383), omitted feedback (09107, 09178, 09179), or gave nonacademic feedback (09100, 09165, 09167). These results are in line with those reported above for student attitudes in math. The students generally gave lower ratings to teachers who reacted to their answers in ways that either explicitly or implicitly indicated a lack of respect for the students' contributions.

There is also a second pattern among the results for feedback variables. Two negative main effects (09033, 09161), and two interactions (09044, 09162) indicate that students, and high ability students in particular, gave lower ratings to teachers who tended to ask a new question of the same student. Variables associated with this practice were generally positively related to student attitudes in math. Asking a new question is a form of sustaining feedback where the teacher "stays with" a student and tries to elicit an improved response or more information. The use of sustaining feedback was unrelated to student attitudes in math or to achievement in either subject. Student attitudes in English, however, were negatively related to both the rates (15398, 15399) and the proportions (09213, 09215) of sustaining feedback. Once again, this seems to be part of the general pattern in which students gave lower ratings to English teachers who tried to elicit high levels of academic performance.

2. Student initiated questions and comments. The rates of student initiated questions and comments were not associated with achievement in English. The rate of student initiated questions was also unrelated to student attitudes, but there was a negative relationship between the rate of student initiated comments and student attitudes (15201). This is part of a small pattern of negative results which includes only irrelevant comments which were called out (15223, 15232, 15236, 09252). The rate of irrelevant questions which were called out and given feedback (15213) was also negatively associated with student attitudes.

There were only two other significant results among the variables in this section. Students tended to give lower ratings to teachers who ignored relevant questions or comments that had been called out (09221, 09243).

These results add to the already considerable complexity of the results describing call outs. Call outs were common in the classes that we observed, and many of the variables associated with call outs were significantly related to both attitude and achievement, in both math and English. Therefore, the question of how the teacher should deal with call outs is an important one. Our data seem to indicate that there are no simple answers to this question. We have found that call outs were differently related to the two criteria, and that even when a single criterion is considered, the relationships may vary according to the type of class, the subject matter, what the student said, and the reactions of the teacher. It seems that our data are more useful for pointing out the importance and complexity of the question than for providing meaningful answers.

C. Private contacts between the students and teacher. Given the strong pattern of negative associations between the rates and proportions of public contacts and student attitudes in English, it is not too surprising that the proportion of private contacts was positively related to student attitudes (09391). The rates of private contacts, however, were not significantly associated with student attitudes (15411, 15412).

A very weak pattern indicated that students may have preferred to ask questions of the teacher rather than have the teacher come to them, especially if the contact was procedural in nature (09387, 09392, 09400).

Among the 60 variables having to do with the nature of the contact and the teacher's feedback, there was only one main effect (15274) and two interactions (09275, 09280). These isolated results will not be interpreted.

D. Behavioral contacts. Both rates of student misbehaviors and the ways that teachers reacted to them were strongly related to student achievement gains in English. One strong pattern of negative relationships revealed that teachers who tolerated high rates of serious misbehaviors were generally less effective. A second pattern of interactions revealed that academically effective teachers tended to react more severely to misbehaviors, especially serious ones, if they were teaching low ability classes.

Variables having to do with rates of misbehaviors and the way teachers reacted to them were largely unrelated to student attitudes in English classes, however. There were only four main effects (09316, 09357, 15296, 15338) and two interactions (09354, 15310) among the 130 variables having to do with behavioral contacts. All of the significant results are isolated, and all are on variables associated with very low frequency events. Since more significant results could be expected as a result of chance alone, these results seem somewhat anomalous, and they will not be interpreted. It could be that students' opinions are dependent on factors which our coding system did not record, or that students' judgments of "appropriate" teacher reactions depended on the context in ways too specific for our coding system to record. The detailed nature of the coding system however, makes these explanations unlikely. It is clear that issues of behavior control at the junior high level deserve further investigation.

E. Social contacts. None of the variables concerning social contacts was related to student attitudes in English. This is somewhat surprising in view of the fact that there was a strong pattern of interactive relationships between these variables and English achievement. The more academically effective teachers tended to accept student-created social contacts in low ability classes, and to reject them in high ability classes. It seems strange that rates of social contacts would be associated with achievement but not with student ratings of the teachers.

III. Summary and discussion

If nothing else, the attitude data in English indicate that junior high school students expect teachers of different subjects to behave differently. The samples of math and English students came from the same schools; many students were in both samples. But they rated their math and their English teachers according to very different criteria. A pattern of heavy academic emphasis, high demand, frequent class discussions, and teacher dominance was both academically effective and accepted by the students in their math classes. There is no evidence that that style of teaching was associated with academic effectiveness for English teachers; neither was it accepted by the students.

We discussed in Chapter 3 our difficulties with measuring the academic effectiveness of English teachers. In the absence of a generally agreed upon curriculum or set of objectives, it was virtually impossible to construct an achievement test that was a valid measure of what the students had learned in their English classes. We do not have similar doubts about the validity of our attitude measure.

However, the attitude results seem to indicate that the students may have been no more sure than we were what they were supposed to be learning in English classes. Not only were student ratings unrelated to the academic effectiveness of the teacher, they also indicated very little about student preferences with regard to instructional techniques. Most of the positive results among the attitude data were on high inference variables which were global ratings of the affective characteristics of the teacher. Students liked teachers who were rated by the observers as affectionate, nurturant, academically effective, competent, enthusiastic, etc. These results are of interest for two reasons. First, they tell us that there was some agreement between students and observers about who the good English teachers were, although the agreement was generally stronger in math. Second, it is of interest that most of these variables were unrelated to academic effectiveness in English, at least as we measured it.

Variables related to teachers' organization, efficiency, discipline and management methods were generally unrelated to student ratings of English teachers, although many of those variables were related to student ratings of math teachers and academic effectiveness in both math and English.

Students apparently did not like for their English teachers to be demanding. Variables associated with teacher questioning, incorrect answers, probing, criticism, and sustaining feedback were all negatively related to student ratings of their English teachers. Our results give few specific clues about what teaching methods the students did like. Positive results among these variables were few and far between, and they did not fall into cohesive patterns.

These results could be interpreted in a number of ways. It is possible that there are several different "good" ways to teach English, making it difficult to find behavior patterns common to most "good" English teachers. It is also possible that the coding system simply failed to describe many of the important behavior patterns of "good" English teachers. Considering the wide variety in goals and methods among the English teachers we observed, it is likely that both of these interpretations are partially valid.

There seems to be another factor at work, however. In general, the variables that were positively associated with student ratings were those which describe "nice" teachers, while those that were negatively associated with student ratings were those which describe "hard" teachers. Students simply did not like English teachers who made them work too hard. Those students were not simply lazy; they gave high ratings to math teachers who made them work hard. It seems more likely that they were not convinced that the English teachers had anything to teach them that justified a great deal of effort on their part. Since demanding teachers were academically no more effective than those who were less demanding, the students may well have been right.

Our data would seem to indicate, therefore, that improvement in the quality of junior high school English teaching may depend on an in-depth examination of the curriculum. We have not found a set of teaching behaviors that seem to be "good" for teachers working with a wide variety of students, and having many different objectives. In the absence of a more general agreement about the goals of junior high school English classes, it will remain very difficult to make generalizations in this field. It may be that most studies in the future will need to concentrate on ways of achieving specific objectives with specific students rather than looking for patterns of behavior that are generally associated with desirable outcomes.

Table 4.1: Relations of Selected Variables to Student Attitudes in Junior High School Math and English Classes

Table 4.1 contains those results which were judged to be both practically and statistically significant, and which were discussed in the text of the chapter.

The table is divided into sections, as follows:

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The symbols used in the tables are as follows:

n.s. = not significant. There was no statistically significant relationship between the classroom behavior and student attitudes in that subject.

+ = positive relationship. There was a significant positive association between the classroom behavior and student attitudes in that subject.

- = negative relationship. There was a significant negative association between that classroom behavior and student attitudes in that subject.

I = interaction. The relationship between the classroom behavior and student attitudes in that subject was significantly different for low and high ability classes.

When there is an interaction, the separate relationships for low and high ability classes are listed in the adjacent columns. A + or - (without parentheses) indicates that the slope of the regression line for that variance and ability level exceeded our criterion for practical significance (.40 A-score units difference in adjusted gain for high and low levels of the behavior). A (+) or (-) (in parentheses) indicates that the slope of the regression line did not exceed our criterion for practical significance.

Results for both math and English, and for both rate and proportion variables are listed together in each section. At the end of each section is a list of variables that were related to achievement in a statistically significant manner but not discussed separately in the text. Additional information on those variables in available in the tables in Volume III.

Table 4.1: Relations of Selected Variables to Student Attitudes in Junior High School Math and English Classes

	Interactions (Math)		Main Effects		Interactions (English)	
HIGH INFERENCE MEASURES (I.)	Low	High	Math	English	Low	High
Classroom Observation Scales (I.A.)						
01002 Teacher initiated problem solving			+	ns		
01004 Teacher presentation of academic information			+	+		
01005 Negative affect (teacher and students)			-	-		
01006 Positive affect (teacher)			+	ns		
01007 Higher cognitive level student behavior			+	ns		
01008 Passive pupil behavior			ns	-		
01009 Convergent evaluative interactions (teacher probes for right answer)			+	ns		
01010 Teacher task orientation			+	ns		
01011 Clarity of teacher presentations			+	ns		
01012 Teacher enthusiasm			+	+		
01013 Random questioning; memory questions; fact related questions			+	ns		
01014 Higher level cognitive questions: synthesis, why questions			+	ns		
01015 Questions with application to students personal lives; personal questions			+	ns		
01020 Factor 1: Attention, clarity, activity			+	-		
01021 Factor 2: Positive affect, enthusiasm			+	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Classroom Observation Scales *(I.A.)* *cont.*	Low	High	Math	English	Low	High
01022 Factor 3: Questioning, evaluation			+	ns		
01023 Factor 4: Pupil interaction/ teacher presentation			–	ns		
Observers' Ratings of Teachers' Methods and Practices *(I.B.)*						
02001 Teacher patience when correcting errors			+	+		
02002 Attractiveness of room			+	+		
02003 Effectivenesss of teachers' management methods			+	ns		
02008 Student obedience to teacher			+	ns		
02009 Quantity of directions; overly explicit and repetitive			+	+		
02010 Classroom interruptions			–	ns		
02014 Consistency of enforcement of rules			+	ns		
02016 Length of time after bell for class to begin			–	ns		
02019 Amount of teacher confusion, fluster			–	ns		
02021 Monitoring of class			+	ns		
02022 Efficiency of transition during the class period			+	ns		
02023 Average level of teacher affection			+	+		
02024 Teacher range of affection: Low end			+	+		
02025 Teacher range of affection: High end			+	+		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Observers' Ratings of Teachers' Methods and Practices *(I.B.) cont.*	Low	High	Math	English	Low	High
02026 Teacher solidarity with group			+	ns		
02027 Teacher anxiety			-	-		
02028 Teacher confidence level			+	ns		
02029 Teacher enthusiasm			+	+		
02030 Student respect for teacher			+	+		
02031 Teacher deals effectively with student personal problems			+	+		
02032 Teacher socializes with students	+	-	+,I	ns		
02033 Teacher awareness of coder			-	ns		
02034 Teacher credibility			+	+		
02036 Academic encouragement given by teacher			+	+		
02037 Receptiveness to student input			+	+		
02038 Nurturance of student affective skills			+	+		
02039 Variety and choice in assignments			-	ns		
02040 Teacher use of self-paced work			-	+		
02041 Teacher use of blackboard for lectures and discussions			+	+		
02042 Teacher use of audio-visual aids			ns	+		
02044 Teacher use of drama; students read parts in plays or stories			ns	-		
02045 Teacher makes productive use of own mistakes			+	+		
02046 Teacher goes to students during seatwork			+	ns		
02047 Student eagerness for response opportunity			+	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Observers' Ratings of Teachers' Methods and Practices (I.B.) cont.	Low	High	Math	English	Low	High
02048 Time allotted for class discussion			+	ns		
02049 Task-oriented seatwork			-	ns		
02050 Amount of teacher preparation			+	ns		
02052 Teacher academic effectiveness			+	+		
02053 Frequency of homework			+	ns		
02054 Amount of class time spent in productive work			+	ns		
02056 Teacher concern for academic achievement, grades			+	ns		
02057 Teacher primarily lectures			+	+		
02058 Teacher primarily assigns seatwork			-	ns		
02059 Teacher primarily uses class discussions			+	ns		
02060 Teacher command of subject matter	+	+	+,I	ns		
02062 Teacher consistently plans sufficient work for class			+	ns		
02064 Coder, if 7th or 8th grader, would choose this teacher			+	+		
02065 Factor 1: Effective teacher organization, control			+	ns		
02066 Factor 2: Orientation to student personal needs, solidarity with group			+	+		
02067 Factor 3: High use of class discussion (vs. seatwork)			+	ns		
02069 Factor 5: Teacher competence, confidence			+	+		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Observers' Ratings of Target Students (I.C.)	Low	High	Math	English	Low	High
03005 Student is constantly being attended to by teacher			+	ns		
03009 Student is highly motivated and eager			+	ns		
03014 Student lacks persistence			-	ns		
03015 Student participates in class			+	ns		
03017 Student has good relationship with teacher			ns	+		
03027 Factor 2: Charisma (outgoing, sociable, happy) with peers and teacher			+	ns		
03028 Factor 3: Physical, athletic development			-	ns		
03029 Factor 4: Students with anti-social tendencies; emotional or behavioral problems			ns	-		
Teachers' Ratings of Target Students (I.D.)						
05001 High student motivation, compared to rest of class			ns	+		
05002 Teacher would want the student in his/her class again			ns	+		
05003 High student academic performance compared to rest of class			ns	+		
05005 Student displays appropriate behavior in class			ns	+		
Observers' Classroom Descriptions (I.E.)						
11001 Teacher reacts positively to student feelings			+	I	-	+
11002 Teacher actively listens to students in reading, reciting, etc.			+	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Observers' Classroom Descriptions (I.E.) cont.	Low	High	Math	English	Low	High
11003 Teacher berates or puts down student in front of others			-	ns		
11005 Warm, family-like feeling to classroom; positive feelings among class			+	+		
11009 Teacher encourages student effort; gives support for work			+	ns		
11012 Teacher adjusts instruction schedule to be flexible			+	ns		
11015 Teacher seems to enjoy teaching			+	ns		
11016 Teacher seems to know content of subject matter			+	+		
11020 Teacher acknowledges student feelings both positive and negative			+	ns		
11021 Teacher perceives student learning rates and adjusts learning pace	-	+	I	+		
11023 Teacher encourages students to take responsibility for their own work			ns	+		
11027 Teacher seems prepared for class			+	I	-	+
11029 Students respect the teacher			+	+		
11030 Teacher is in control of the class and maintains order			+	ns		
11032 Observers overall positive evaluations of the teacher			+	+		
LOW INFERENCE MEASURES (RATES AND PROPORTIONS) (II.)						
Use of Time in the Classroom (II.A.)						
15364 Minutes in small group, not teacher controlled			ns	-		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Use of Time in the Classroom (II.A.)	Low	High	Math	English	Low	High
15367 Minutes in transitions			-	ns		
15370 Minutes in lecture demonstration			+	ns		
15371 Minutes in discussion			+	ns		
15372 Minutes in drill			+	ns		
15373 Minutes in special activities (not included in previous categories)			-	ns		
15374 Minutes in advance organizers			-	ns		
15376 Minutes in individual self-paced work			-	ns		
15381 Number of peer tutoring situations			ns	-,I	+	-
Public Contacts between the Teacher and Students (II.B.)						
09397 Student created public contacts			+	-		
09398 Teacher initiated public contacts (excluding behavior)			+	ns		
15392 Teacher-student contacts			+	ns		
15400 Teacher-student contacts which were student initiated			+	ns		
Academic Response Opportunities (II.B.1.)						
09384 Teacher-student contacts which were response opportunities			+	-		
15393 Public response opportunities			+	-		
Statistically significant results not discussed:						
Math: 15005, 15006, 15007, 15010, 15011, 15012, 15013, 15021, 15023, 15024, 15026, 15028, 15031, 15032, 15033, 15035, 15037, 15038, 15039, 15044, 15045, 15047, 15050,						

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Academic Response Opportunities (II.B.1.) cont.	Low	High	Math	English	Low	High
Math (cont.): 15051, 15053, 15079, 15080, 15091, 15112, 15119, 15141, 15142, 15143, 15183						
English: 15006, 15009, 15010, 15012, 15025, 15030, 15031, 15032, 15033, 15034, 15036, 15037, 15038, 15039, 15045, 15051, 15052, 15081, 15084, 15107, 15114, 15116, 15120, 15121, 15147						
Types of questions						
09004 Response opportunities generated by opinion questions	-	+	I	ns		
15001 Response opportunities generated by process questions			+	ns		
15002 Response opportunities generated by product questions			+	-		
15003 Response opportunities generated by choice questions			+	ns		
Selection of respondents						
09010 Response opportunities given to students preselected in nonpatterned turns			ns	I	+	-
09013 Response opportunities which students answered by calling out			-	+		
09064 Preselected nonpatterned turn students who were asked product questions	-	+	I	I	+	-
09076 Product questions answered by a student calling out			ns	+		
09078 Opinion questions answered by student calling out			-	ns		

	Interactions (Math)		Main Effects		Interactions (English)	
(II.B.1.) cont. *Selection of respondents (cont.)*	Low	High	Math	English	Low	High
09201 Correct answers given by preselected nonpatterned turn students	-	+	I	I	+	-
09204 Correct answers given by students who called out			-	+		
09206 Incorrect answers given by preselected nonpatterned turn students			ns	I	+	-
09209 Incorrect answers given by students calling out			ns	+		
09211 Don't know/no response answers given by preselected nonpatterned students			ns	I	+	-
Quality of responses						
09019 Correct answers	+	-	I	+		
09020 Incorrect answers	-	+	I	-		
09005 Process questions which students answered correctly	+	-	I	ns		
09006 Product questions which students answered correctly			ns	+		
09007 Choice questions which students answered correctly			+	ns		
09017 Volunteers who answered correctly	+	-	I	ns		
09050 Process questions which students answered incorrectly	-	+	I	ns		
09051 Product questions which students answered incorrectly	-	+	I	-		
09052 Choice questions which students answered incorrectly			-	ns		
09127 Preselected patterned turn students who answered incorrectly			ns	I	+	-

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
(II.B.1.) cont. *Quality of responses (cont.)*						
09129 Nonvolunteers who answered incorrectly			ns	-		
15019 Correct answers			+	-		
15020 Incorrect answers			+	-		
Feedback to student responses						
09023 Correct answers which teacher praised			+	ns		
09024 Correct answers after which teacher asked a new question			+	ns		
09025 Correct answers after which teacher asked a nonacademic question			-	ns		
09030 Incorrect answers which teacher criticized			ns	-		
09033 Incorrect answers after which teacher asked a new question			+	-		
09035 Incorrect answers which teacher integrated into class discussion			+	ns		
09044 Don't know and no response answers after which teacher asked a new question			ns	I	+	-
09080 Answers to product questions which teacher praised			+	ns		
09084 Answers to product questions which teacher criticized			ns	-		
09088 Product questions after which teacher repeated the question	-	(+)	-,I	ns		
09095 Process questions after which teacher asked a new question			+	ns		
09096 Product questions after which teacher asked a new question			+	ns		

(II.B.1.) cont. *Feedback to student responses (cont.)*	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
09100 Product questions after which teacher asked a nonacademic question	-	+	-,I	-		
09107 Process questions after which teacher gave no feedback			ns	-		
09115 Process questions after which teacher gave the answer	-	+	-,I	ns		
09121 Choice questions after which teacher asked another student			-	ns		
09142 Nonvolunteers whom teacher praised			+	ns		
09143 Volunteers whom teacher praised			+	ns		
09144 Call-out students whom teacher praised			+	ns		
09147 Nonvolunteers whom teacher criticized			ns	-		
09153 Volunteers for whom teacher repeated the question			-	ns		
09154 Call-out students for whom teacher repeated the question			-	ns		
09158 Volunteers for whom teacher simplified the question			+	ns		
09161 Preselected nonpatterned turn students whom teacher asked a new question			ns	-		
09162 Nonvolunteers whom teacher asked a new question			+	I	(+)	-
09163 Volunteers whom teacher asked a new question			+	ns		
09165 Preselected patterned turn students whom teacher gave nonacademic feedback			ns	-		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
(II.B.1.) cont. *Feedback to student responses* *(cont.)*	Low	High	Math	English	Low	High
09167 Nonvolunteers whom teacher gave nonacademic feedback			ns	-,I	(+)	-
09172 Nonvolunteers whose answers were integrated into class discussion			ns	+		
09178 Volunteers whom teacher gave no feedback			ns	-		
09179 Call-out students whom teacher gave no feedback			+	-		
09182 Nonvolunteers whom teacher gave process feedback			ns	+		
09188 Volunteers whom teacher gave the answer	-	+	-,I	ns		
09190 Preselected patterned turn students terminated by teacher asking another			ns	I	+	-
09213 Incorrect answers after which teacher gave sustaining feedback			ns	-		
09215 All response opportunities which teacher gave sustaining feedback			ns	-		
09382 Response opportunities in which teacher praised			+	ns		
09383 Response opportunities in which teacher criticized			ns	-		
15395 Academic praise			+	ns		
15397 Sustaining feedback given an incorrect response			+	-		
15399 Sustaining feedback			+	-		
15409 Reinforcing teacher-student contacts			+	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
Student initiated questions and comments (II.B.2.)	Low	High	Math	English	Low	High
09221 Student initiated relevant questions called out and ignored			ns	-		
09223 Student initiated relevant questions called out and given feedback			-	ns		
09228 Student initiated irrelevant questions called out and not accepted			-	ns		
09236 Student initiated relevant questions integrated into class discussion			-	ns		
09243 Student initiated relevant comments called out and ignored			ns	-		
09252 Student initiated irrelevant comments called out and given feedback			ns	I	0	-
09257 Student initiated relevant comments given process feedback			+	ns		
09258 Student initiated relevant comments integrated into class discussion			+	ns		
15200 Student initiated questions and comments which were questions			ns	ns		
15201 Student initiated questions and comments which were comments			ns	-		
15208 Student initiated relevant questions called out and given process feedback			+	ns		
15213 Student initiated irrelevant questions called out and given feedback			ns	-		
15214 Student initiated questions which were not called out			+	ns		
15215 Student initiated questions which were relevant			+	ns		

	Interactions (Math)		Main Effects		Interactions (English)	
(II.B.2) cont. *Student initiated questions and comments (cont.)*	Low	High	Math	English	Low	High
15217 Student initiated relevant questions which were given feedback			+	ns		
15218 Student initiated relevant questions which were given process feedback			+	ns		
15220 Student initiated relevant questions integrated into class discussion			+	ns		
15223 Student initiated comments which were called out			ns	-		
15224 Student initiated relevant comments which were called out			+	ns		
15229 Student initiated relevant comments called out and given feedback			+	ns		
15230 Student initiated relevant comments called out and given process feedback			+	ns		
15231 Student initiated relevant comments called out and integrated into discussion			+	ns		
15232 Student initiated irrelevant comments which were called out			ns	-		
15236 Student initiated irrelevant comments called out and given feedback			ns	-		
15238 Student initiated relevant comments which were not called out			+	ns		
15241 Student initiated relevant comments given process feedback			+	ns		
15242 Student initiated relevant comments integrated into class discussion			+	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
(II.B.2.) cont. *Student initiated questions and comments (cont.)*						
15413 Student initiated questions and comments			ns	ns		
Private Contacts between the Teacher and Students (II.C.)						
09268 Student created contacts which were related to classroom procedure			-	ns		
09281 Student created content related contacts given brief process feedback			+	ns		
09284 Teacher initiated contacts which were academic related			+	ns		
09293 Teacher initiated academic contacts which involved brief process feedback			+	ns		
09296 Teacher initiated contacts related to classroom procedure			-	ns		
09387 Teacher-student contacts which were student created (private)			-	+		
09388 Teacher-student contacts which were teacher initiated (private)			-	ns		
09391 Teacher-student contacts which were private (not public response opportunities)			-	+		
09392 Private teacher-student contacts which were student created (not social)			ns	+		
09395 Private academic contacts			+	ns		
09396 Private nonacademic contacts			-	ns		
09400 Student created private porcedural contacts			ns	+		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
(II.C.) cont. *Private Contacts between the Teacher and Students (cont.)*	Low	High	Math	English	Low	High
15248 Student created contacts related to classroom procedure			-	ns		
15273 Teacher initiated academic contacts which involved brief process feedback			+	ns		
15274 Teacher initiated academic contacts which involved long feedback			-	-		
15276 Teacher initiated contacts which related to classroom procedure			-	ns		
15401 Procedural contacts			-	ns		
15411 Private student created contacts			ns	ns		
15412 Private teacher initiated contacts			ns	ns		
Significant results not discussed:						
Math: 15270 English: 09274, 09280, 15274						
Behavioral Contacts (II.D.)						
15394 Behavioral contacts			ns	ns		
15407 Mild misbehaviors	+	-	I	ns		
15408 Serious misbehaviors			ns	ns		
09303 Misbehaviors during which student was verbally aggressive			-	ns		
09305 Misbehaviors involving student leaving class without permission			-	ns		
09315 Misbehaviors in which teacher delayed management request (timing error)			-	ns		

Table 4.1 (cont.)

(II.D.) cont. *__Behavioral Contacts__ cont.*	Interactions (Math)		Main Effects		Interactions (English)	
	Low	High	Math	English	Low	High
09317 Misbehavior which teacher criticized	+	-	I	ns		
09327 Mild misbehaviors where teacher intervened nonverbally	+	-	I	ns		
09336 Misbehaviors involving tardiness which teacher criticized	+	-	I	ns		
09340 Disruptive misbehaviors which teacher criticized			-	ns		
09358 Misbehaviors not in above categories which teacher criticized			+	ns		
09362 Misbehaviors in which teacher acted without target or timing error	+	(-)	I	ns		
09370 Mild misbehaviors which teacher handled without error	+	-	I	ns		
09372 Mild misbehaviors for which teacher made a timing error			-	ns		
09375 Serious misbehaviors for which teacher made a target error			-	ns		
15279 Misbehaviors involving students socializing	+	-	I	ns		
15283 Misbehaviors during which student was verbally aggressive	(-)	-	I	ns		
15285 Misbehaviors involving students leaving class without permission			-	ns		
15312 Socializing misbehaviors involving a management request	+	-	I	ns		
15315 Tardiness given a management request			-	ns		
15316 Misbehaviors involving tardiness which teacher criticized	+	-	I	ns		

Table 4.1 (cont.)

	Interactions (Math)		Main Effects		Interactions (English)	
(II.D.) cont. *Behavioral Contacts cont.*	Low	High	Math	English	Low	High
15330 Leaving room without permission responded to with management request			-	ns		
15384 Mild misbehaviors which teacher handled without error	+	-	I	ns		
Significant results not discussed:						
Math: 15338 English: 09316, 09354, 09357, 15296, 15310, 15338						
Social Contacts between the Teacher and Students (II.E.)						
15339 Teacher initiated contacts which were social			ns	ns		
15340 Student created contacts which were social			ns	ns		

Chapter 5

Summary and Discussion

In this chapter we will summarize the results and implications of this study. Our discussion will be divided into three parts. In the first section of the chapter we will summarize the methods and procedures used for data collection and data reduction. In the second section we will present the more important patterns of results and discuss briefly the implications of those results for issues having to do with junior high school teaching. In the final section we will discuss the implications of this study for future research on teaching at the junior high school level.

Introduction and Methodology

This report presents process-outcome relationships found in the data from the Texas Junior High School Study. This study was conceived as a replication and extension of an earlier study of teaching effectiveness conducted by the Correlates of Effective Teaching Program at the University of Texas Research and Development Center for Teacher Education (Brophy & Evertson, 1976; Note 2).

Sixty-eight teachers (39 English and 29 math) were observed in nine of the 11 junior high schools in a large urban school district. Two sections were observed for each teacher; there were 136 classrooms in all. Two observers alternated visits to each of these classes, for an average of 20 one-hour observations throughout the school year 1974-75.

During their visits the observers collected both high- and low-inference data on classroom processes. The low inference data were collected with a complex Classroom Observation Coding System, which was an adaptation of the coding system used in the Texas Teacher Effectiveness Study

(Brophy & Evertson, Note 2). The coding manual is available as Appendix C to this report. The high-inference data on classroom processes were collected with six different instruments, as follows:

1. *Classroom Observation Scales*, completed after each observation
2. *Classroom Descriptions*, written after each observation, then rated as a set at the end of the year for each class
3. *Observation Ratings of Target Students*, completed for 12 randomly selected students in each class at the end of the school year
4. *Observer Ratings of Teachers' Methods and Practices*, completed at the end of the school year
5. *Teacher Ratings of Target Students*, completed at the end of the school year
6. *Students' Ratings of Teachers*, completed by the students at the end of the school year

The *Student Ratings of Teachers* served as one outcome measure. The other was an achievement test designed to reflect the subject matter taught in the observed classrooms. Students' scores on the English and math subtests of the California Achievement Tests given in the spring of the preceding school year were used to estimate entering ability.

The class was used as the unit of analysis for all analyses reported in this report. When data were collected for individual students (as for the pretest and posttest scores, the student ratings and the attitude measure), all of the available scores were averaged for each of the 136 classes. Data collected continuously over the course of the year, such as those from the *Classroom Observation Scales*, were averaged to produce a single score representing "average behavior" for all of the observations.

Two types of variables were generated from the coded data produced by observers using the low-inference coding system. Rate variables were created by dividing the total number of times that an event was observed over the course of the year by the number of 50-minute observation periods that the observers spent in that classroom. Thus the rate variables represent the "average frequency" of an event during a typical observation period. Proportion variables were ratios of rate variables. Thus proportion variables represented the proportion of the time that some event occurred as opposed to some alternative or set of alternatives.

Once class average scores had been generated for each of the process and outcome measures, a long series of analyses were conducted which related the process measures to the outcome measures. Volume II consists of tables showing the relationship of each of the process measures to scores on the achievement test given at the end of the year. These results are discussed in Chapters 2 and 3 of this report. Volume III consists of tables showing the relationship of each of the process measures to a factor score from the attitude measure which estimated the student's overall positive or negative evaluation of the teacher. These results are discussed in Chapter 4 of this volume. Data from math and English classes are presented separately.

The relationship between each of the process variables and each outcome measure was analyzed by means of a multiple-regression procedure designed to detect three possible relationships between the process variable and the outcome measure, as follows:

1. Tests for simple linear relationships (main effects) detected general trends in which classes exposed to differing levels of the classroom behavior differ in their outcome scores.

2. Tests for interactive relationships detected differences in the relationship between the classroom behavior and the outcome scores depending on the entering ability of the students.

3. Tests for curvilinear relationships detected situations in which the best (or worst) scores on the outcome measure were associated with neither extremely high nor extremely low incidences of the classroom behavior, but rather with levels that lay within the range of observed scores.

For all analyses, the California Achievement Test scores from the previous spring were used as covariables, so that differences among students' entering abilities were controlled statistically.

About 9,000 tests for significance were performed, and over 1,000 of those tests were significant at the .05 level. Not all of those results were useful, however. Less than 5% of the tests for curvilinear relationships were significant at the .05 level, and most of those that were significant added little information to the analyses for main effects and interactions. Therefore we have generally ignored curvilinear relationships in our discussion of the results (although some of the significant ones are presented for interested readers at the ends of Volumes II and III). We do not mean by this that curvilinear relationships between classroom behaviors and outcome measures do not exist; rather, we have failed to detect them reliably with the methods we used in the present study.

Interactions and main effects were both very common, but again, not all of these results were equally useful. In general, we discussed and reported on those results which were both practically and statistically significant (our criteria are discussed in more detail in Chapters 1 and 3). The results of every test for interactions and main effects are presented in Volumes II and III for interested readers.

For a more extensive discussion of the background for the study, our methodology, the characteristics of the sample, and other reports using this data base, the reader is referred to Chapter 1.

Summary of Results

In this section we will discuss important patterns of results in two different ways. First, we will summarize what our results have to say about the characteristics, methods, and practices of "good" junior high math and English teachers. As we do so, we will attempt to synthesize and contrast the data using achievement and student attitudes as outcome measures. Second, we will discuss the implications that our results have for a number of issues that have played a prominent role in discussions of teaching in the past.

Math classes. The picture that emerges of a "good" junior high math teacher is about the same whether student achievement test gains, student attitudes, or the observers' opinions are used as the criteria. The more popular and academically more effective teachers were rated by the observers as having better classroom management, being better organized, enjoying teaching more, being better prepared, knowing their subject better, being more concerned about their students, being more respected by their students, and so forth. These data are useful in that they provide support for the validity of our criterion measurements, but they do not enable us to make recommendations about appropriate teaching techniques or strategies in junior high school math classes, since they are general ratings.

The low-inference data revealed a number of patterns which differentiated between successful and unsuccessful teachers in more specific ways. The following patterns of results were apparent whether achievement or attitude was used as the criterion:

1. The successful teachers emphasized class discussion, lectures, and drill, and spent less time using individualized instructional techniques or individual seatwork. All teachers, however, assigned seatwork some of the time, and our results could be interpreted as indicating that class discussions are an important part of math instruction, rather than that seatwork is ineffective as an instructional technique.

2. The more successful teachers were highly task-oriented and businesslike in their instruction. This was especially true of the successful teachers of high ability classes; there was some evidence that students in low ability classes liked and benefitted from a teaching style that included tolerance of some distractions and indications by the teacher of personal interest in the students.

3. The more successful teachers tended to more active. They had more interactions with their students, especially during class discussions, and they tended to dominate patterns of interaction. Students generally

talked to the teachers rather than each other.

4. The successful teachers made more extensive use of praise during class discussions, and generally treated students' contributions with respect.

5. The more successful teachers were rated as being better classroom managers, but the low-inference data indicated that behavior problems were observed just as often in their classes as in those of less successful teachers. Our data indicate that they may have been better at dealing with behavior problems in a low-key manner that prevented those problems from seriously disrupting the class.

There were differences in the results when achievement and attitude were used as criteria, but those differences tended to involve subtle details rather than major trends. The more important patterns among the differences included the following:

1. The use of monitoring and accountability techniques was more closely associated with achievement than with attitude, while variables having to do with nurturance and affective skills were associated very strongly with student attitudes, but only marginally with achievement.

2. Teachers who asked relatively more process questions were successful in inducing achievement gains, but there was no evidence that the types of questions asked affected student attitudes.

3. Teachers who tolerated large numbers of call outs were rated lower by their students, but there was little evidence that this practice was actually harmful to achievement in the observed classes. It may even have been helpful in some situations, especially with low ability classes.

4. We found few patterns of associations between achievement and

the way that teachers gave feedback to students after they had answered questions, but it appears that students, especially those in low ability classes, were quite sensitive to the ways that teachers treated their contributions. They gave lower ratings to teachers who overtly or subtly "put down" the students and higher ratings to teachers who listened and responded to students respectfully.

Overall, the data on junior high math classes form a consistent and reasonable picture. It is clear that teachers, students, and observers generally agreed about the purpose of junior high school math teaching, and people with different viewpoints described "good" teachers in similar ways.

It must be emphasized, however, that we do not have a prescription for improving junior high school math teaching. Rather, we have a description of how the better teachers differed from those who were less successful in our sample. It may well be that methods which we observed rarely or not at all are more effective than any of those commonly used by the teachers in this sample. Even if we assume that we do in fact have a description of "good" teaching, it does not necessarily follow that that description can be used to improve the skills of math teachers. Our data do not separate behaviors which cause students to learn better from short-term outcomes which are indications that the students are learning better. Does extensive use of public praise, for instance, cause students to learn better, or is the presence of praise simply an indication that the students are giving good answers to the teacher's questions?

The methods used in this study leave yet another question unanswered. To what extent can teachers change their behavior on the variables we have observed, and will a change in teaching behavior produce the same results as it does for teachers who use a method "naturally"? Extensive use of class discussion and moderate use of seatwork, for instance, were strongly associated with higher achievement test scores in our sample. Should we then recommend that teachers should spend more time in class discussion? Unfortunately, it is not that simple. Good and Grouws, in a similar study at the fourth grade level (Notes 12 and 13), found that not only the best teachers but also the worst teachers made extensive use of class discussions. To run a successful discussion at the junior high school level, the teacher must have good control over the class, enough time to plan the discussion well, and enough energy to do it five times a day. For teachers who lack the classroom control, the time, or the energy, it may well be that assigning seatwork is better than holding disastrous class discussions.

The methods we have used for this study will not answer the questions we have raised in the preceding paragraphs. They can be attacked by means of experimental studies such as those done by Anderson, Evertson, and Brophy on first-grade reading groups (in press), by Good on fourth-grade math (Note 13), or Gage, Crawford, and associates in third-grade classes (Note 15).

English classes. In many ways the most interesting results from the data collected in English classes have to do with methodological issues rather than patterns of significant results. Some of those methodological problems, however, have substantive implications. Three of those will be discussed in the following paragraphs.

First, the pretest accounted for an extremely high proportion (85%) of the variance on the posttest. In part this is a reflection of the wide range of entering abilities among the students, some of whom were not

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native speakers of English. This result is also an indication that the achievement test scores of the students in our sample depended far more on the students' backgrounds than it did on anything that happened in their English classes. Our data do not support the conclusion, however, that English teachers had no effect at all on their students' achievement test scores. Although the results for English classes are less satisfactory than those for math classes, there were far too many significant results to be accounted for by chance alone.

Second, interactions far outnumbered main effects among the data using achievement as the outcome measure. This pattern of results implies that academically effective teachers used different patterns of teaching behavior for high- and low-ability classes. This result is not surprising in view of the wide range of entering abilities and the diversity of ethnic composition among the observed classes. It is of interest, however, that interactions were much more common among the English data than among the math data.

Third, the association between achievement test scores and the attitude measure was insignificant when entering ability was controlled for (R^2 drop = .0006, $\underline{p}$ = .57), and the patterns of results were entirely different from the two outcome measures. We believe that this reflects a general lack of consensus among students and teachers about the goals and appropriate methods for English teaching.

Our methodological problems also raise serious substantive issues for people who are interested in improving the quality of teaching. Our data indicate that one central problem is the lack of a shared perception of the goals and importance of junior high English classes. Metz (1978) points out the difficulties of teaching low-SES students who do not share the teachers' perceptions of the importance of what they are studying. In English it appears that there is no agreed-upon set of skills or goals which are generally perceived as important and which are the exclusive responsibility of junior high English teachers. This leads not only to difficulties with measuring learning outcomes, but also to difficulties with getting students to perceive their work as important. Thus students tend to judge their English teachers primarily by affective criteria rather than their academic effectiveness (as judged by the achievement test). It would appear that a primary concern of those who would improve the quality of of junior high school English teaching must be that of constructing a consensus about goals in which teachers, administrators, and students all are able to share.

In the following paragraphs we will discuss the achievement and attitude data separately. Looking first at the achievement results, we find that the high inference ratings of English teachers produced surprisingly few interpretable results. Teachers who were well-liked by the observers, and those who were rated as being kind, enthusiastic, well-organized, having the respect of their students, etc., were no more successful in producing achievement gains in their students than those who were rated lower. We believe that the lack of significant results is more likely to be due to the difficulty of constructing an achievement test that accurately reflects the many goals of English teachers than to problems with the ratings themselves.

There were also many uninterpretable results among the data produced with the low-inference coding system, but among those were two fairly clear patterns of main effects and four patterns of interactions most of the interpretable main effects fell into one of the following patterns:

1. Students were less likelyto show large achievement gains in classes where serious misbehaviors were common;

2. Teachers who praised their students more often during class discussions tended to be more successful in inducing student achievement gains.

Patterns of significant interactions included the following:

1. In low-ability classes the successful teachers were more likely to accept or tolerate called out questions and comments than their less successful collegues. This trend was reversed for teachers of high ability classes.

2. Effective teachers of low-ability classes were more likely than less successful teachers to accept private contacts with their students, especially about nonacademic matters. In high-ability classes the effective teachers were more likely to discourage such contacts.

3. Successful teachers of low-ability classes tended to accept more of their students' attempts to start social conversations than less successful teachers. In high-ability classes the successful teachers tended to discourage social interactions with their students.

4. Successful teachers of low-ability classes were more likely to react severely to their students' misbehaviors. Successful teachers of high-ability classes were rarely criticized or threatened unruly students.

The attitude data indicate that students apparently judged their English and math teacher by very different criteria. As we noted above, students tended to like the characteristics in their math teachers that were also associated with academic effectiveness. The students tended to give higher ratings to their English teachers, but the English teachers who got the highest ratings were the ones who showed respect, concern, and interest in their students, not those who were academically the most effective, at least as we measured English achievement.

Most of the positive results among the attitude data were on high-inference variables which were global ratings of the affective characteristics of the teacher. Students liked teachers who were rated by the observers as affectionate, nurturant, academically effective, competent, enthusiastic, etc. These results are of interest for two reasons. First, they tell us that there was some agreement between students and observers about who the good English teachers were, although the agreement was generally stronger in math. Second, it is of interest that most of these variables were unrelated to academic effectiveness in English, at least as we measured it.

Variables related to teachers' organization, efficiency, discipline, and management methods were generally unrelated to student ratings of English teachers, although many of those variables were associated with positive student ratings of math teachers and academic effectiveness in both math and English.

Students apparently did not like for their English teachers to be demanding. Low-inference variables associated with teacher questioning, incorrect answers, probing, criticism, and sustaining feedback were all negatively related student ratings of their English teachers. Our results give few clues about what teacher methods the students did like. Positive results among these variables were few and far between, and they did not fall into cohesive patterns.

Issues in teaching and learning. The data reported in this paper are relevant to a number of issues that have occupied researchers on teaching. On the following pages we will address several of those issues, and try to synthesize and interpret our findings. The issues that we will discuss include the following:

1. Choices of teaching methods
2. Individualized instruction
3. Classroom atmosphere (nurturance and task orientation)
4. Dealing with misbehavior (classroom management)
5. Pacing of instruction
6. Sustaining feedback
7. Use of praise and criticism
8. Conducting class discussions:
    a. Higher-order questions
    b. Appropriate difficulty levels for questions
    c. Selection of students (call outs, nonvolunteers, and volunteers)
    d. Acceptance of student ideas and contributions

Choices of teaching methods. Our observers saw far more seatwork than any other format, while the next most commonly observed were lectures and class discussions. Other formats, such as those dealing with individualized instruction, peer tutoring, testing, games, etc., were observed far less commonly. In general our data, especially for math, seem to indicate that many teachers were assigning more seatwork than would be ideal, and having too few class discussions. The math teachers who had more class discussions and less seatwork were generally more effective and rated higher by their students.

Individualized instruction. Most of the teachers in our sample used individualized instructional techniques rarely, although two other schools in the district had completely individualized math programs. Our data indicate that individualized instruction as used in our sample was less effective than alternative techniques, and was generally unpopular among the students. Again this pattern of results was stronger for math classes.

Our data support the contention that we did not see individualized instruction being effectively used. Extensive use of seatwork, lack of class discussions, and problems with managing both students and materials were common characteristics of individualized classes, and they were negatively associated with student achievement gains in our data. Our pattern of results might have been different if our sample had included the two schools where teachers were using individualized instruction with the active support of the school administration.

Classroom atmosphere (nurturance and task orientation). It is worth noting that nurturance and task orientation were not mutually exclusive qualities among the teachers in our sample. The best teachers tended to be rated as both highly nurturant and highly task-oriented. Not surprisingly, qualities such as warmth, nurturance, enthusiasm, and solidarity with the student group tended to be associated more strongly with student attitudes than with achievement, but those qualities were associated with both attitudes and achievement, especially in math classes.

It appears that our data support the following generalizations about levels of demand and task orientation:

1. A highly demanding, task-oriented atmosphere is justified when there is consensus among the teachers and students about the goals of instruction and the value of that instruction. This condition was met best for math classes, especially high-ability math classes.

2. Students generally preferred a slightly lower level of task orientation than may be academically ideal, but they gave positive ratings to teachers who are very demanding and academically effective (especially for math classes).

For English classes, where the first condition was apparently not generally met, task-oriented and demanding teachers were academically no more effective than other teachers, and they tended to be less popular among their students. In math classes, on the other hand, the more demanding teachers tended to be academically more effective and to get positive ratings from their students.

Dealing with misbehavior (classroom management). In our earlier studies in the primary grades (Anderson et al., in press; Brophy & Evertson, 1976) we have generally found that rates of misbehavior were strongly negatively correlated with achievement. This pattern of results was repeated only for the English achievement data in the present study. In math the rates of misbehavior were generally unrelated to achievement, but the more effective teachers were rated by the observers as better classroom managers, and many variables describing teachers' reactions to misbehavior were significantly associated with achievement. In general, it appears that the more effective teachers were able to deal with misbehavior in such a way that they caused minimum disruption. They reacted mildly to student misbehaviors when a mild reaction was sufficient to bring it to an end, but they dealt severely with serious or persistent misbehavior rather than allow continued disruption. Thus severe reactions to misbehavior were more likely to be appropriate in low-ability classes, where student misbehavior was more common.

Pacing of instruction. We did not keep track of the number of pages or textbook chapters covered, but we did find that successful math teachers tended to maintain a faster pace in their classes. Thay had more interactions with their students, especially during class discussions, and they tended to keep those interactions shorter. They kept the class on task, and generally were not easily distracted from their academic purposes. Our results support those of Good and Grouws (Note 13), who found that fourth-grade teachers who kept their math classes moving at a faster pace were generally more effective. For English we found no general pattern of associations between variables related to pacing and either achievement or attitude.

Sustaining feedback. We have found in earlier research at the primary level (Anderson et al., in press; Brophy & Evertson, Note 2) that the use of sustaining feedback, where the teacher "stays with" the student after an error and tries to elicit an improved response, was positively associated with achievement in certain situations. In this study, sustaining feedback was generally unassociated or negatively associated with both achievement and attitudes. The difference in our results may be due to the fact that sustaining feedback, while it benefits the student who receives the feedback, also tends to slow down the pace of the class. In the primary grades, where students learn mainly from individual interactions with the teacher, the slower pace is justified in skill-learning situations. At the junior high school level, however, students are capable of learning much more from listening to class discussions; so slowing down the discussion for the purpose of giving sustaining feedback to a single student is less often justified.

Use of praise and criticism. We have found that teachers in the primary grades tended to overuse praise to their students, especially nonspecific praise that was given to students who had come to the teacher "asking for" praise of their work (Brophy & Evertson, 1976; Note 2). Praise which specified what the teacher liked about the student's performance, however, was positively related to achievement (Anderson et al., in press).

It appears that at the junior high level, teachers were much less likely to be "gushy" and to overpraise. In fact, the opposite problem was more common. The more successful teachers tended to praise more often during class discussions, making sure that their students knew when thay had made good contributions. The rates of private praise were generally unrelated to either achievement or attitude. Academic criticism was very rarely observed and unrelated to achievement, though it was negatively related to student attitudes in English.

Higher-order questions. Flanders (1970) and others have emphasized the value of questions that demand thinking on the part of students rather than simple recall of facts. Our data provide very limited support for this position. Math teachers who asked more questions tended to be more effective, regardless of type. In addition, the proportion of process questions calling for an explanation from the student was positively related to math achievement. Most of the questions asked were coded as product questions because they called for simple answers. It is virtually impossible to tell in many cases what type of thinking a product question demands of the student. For instance, the question, "How many even-numbered primes are there?" may involve thinking about the set of prime numbers, but the teacher may also simply be asking the student to remember what was said in the class the day before. It does appear that questions that are too difficult or that slow down the pace of the class are inappropriate, whether they are higher-order questions or not.

Selection of students. Our data reveal that teachers' methods of selecting students to respond to their questions varied enormously from teacher to teacher. The most commonly observed methods were calling on nonvolunteers (an average of about 45% of the time), calling on volunteers (around 25%) or call outs from students who had not been called on (around 25%), but different teachers used very different patterns of selection. High rates of calling on volunteers tended to be positively related to achievement. Teachers who were able to use this method often tended to have good control over their classes and students who were interested enough to answer. The practice of calling on nonvolunteers who were following the class discussion and knew the answers appeared not to be particularly harmful, but when teachers often called on nonvolunteers who answered incorrectly, is was a sign of trouble. Call outs were very common in the classes that we observed, and they were often related significantly to both achievement and attitude. Thus the teacher's handling of call outs must be viewed as an important issue. The direction of the relationships, however, depended on the subject matter, the ability level of the students, what it was that the student said, the reaction of the teacher, and probably many other factors. Most teachers had rules discouraging call outs, but those rules obviously were not consistently enforced by many teachers. In some situations large numbers of call outs were apparently indications that the teachers had lost control of the class, while other teachers were able to use call outs effectively to keep the class moving at a fast pace and encourage free student participation.

Acceptance of student contributions and ideas. Flanders (1970) and others have emphasized the importance of accepting student contributions to class discussions and allowing student ideas to play a major role in those discussions. Our data provide some support for this practice, but only in the context of a strong academic orientation and well-planned classes. Students tended to give lower ratings to teachers who often ignored their contributions to class discussions, criticized them, or otherwise failed to give them proper consideration. Teachers who often praised student contributions or otherwise treated tham in a respectful manner (even if they were wrong) were generally rated higher by their students. The use of praise, as we have noted above, was positively associated with achievement in both math and English, and teachers who had high rates of student initiated comments and questions in math classes were academically more effective in math. There were limits, however, to the effectiveness of student participation. High rates of irrelevant questions and comments, especially if they were called out, were associated with lower academic effectiveness.

Implications for Future Research on Teaching

We now turn from discussion and interpretation of the findings to broader discussion of classroom processes and process-outcome relationships as they are affected by grade level and other context variables. Recall that this study was one of a series of related studies, and in particular was designed to replicate our earlier research at the sencond- and third-grade level (Brophy & Evertson, 1976; Note 2) as closely as possible. It is instructive to consider the findings from this perspective.

The kinds of classroom process variables included in the coding system (level of question, type of response opportunity, quality of student answer, and type of teacher feedback during public response opportunities, student initiated comments and questions, and various categories for private and behavioral interactions and for teacher behaviors during such interactions) were selected in the first place because they seemed to be important in the grades under study at the time (Brophy & Evertson, 1976; Note 2). The rich set of findings derived from that and related studies at the early grades indicate that they were, in fact, important. These same studies also illustrated the value of our research strategy of spreading classroom observations across the school year and using adjusted scores from an end-of-the-year achievement test as the learning criterion. We were working at grade levels where curriculum and instruction are relatively homogeneous compared to later grade levels, and we concentrated on basic skills, where this is especially true.

The findings from the present study underscore our contention that the teaching-learning situation is so different at different grade levels that contrasting patterns of process-outcome relationships are to be expected, and differing research strategies may be necessary to document them. These inferences can be drawn both from the general differences in numbers and types of findings between our earlier work and the present study, and within the present study, from the differences in findings between the math and the English classes.

A general difference in the studies is that the earlier findings (Brophy & Evertson, 1976; Note 2) were both more numerous (a higher percentage of possible relationships reached statistical significance) and more interpretable (the findings fit together in large patterns and seldom were contradictory). We believe that much of the reason for this is that the various coding systems based on the original Brophy-Good dyadic system (Brophy & Good, 1970), including the coding system used in the present Junior High School Study, do a better job of capturing classroom process variables related to learning outcomes in the early elementary grades than they do at the higher grades. In the early grades, public recitation situations really are more like a series of dyadic interactions than a true group lesson directed to the group as a whole, and the quantity and quality of these dyadic interactions with each individual student seems to depend much more heavily on the quantity and quality of interactions, both public and private, that that particular student shares with the teacher, and is much less affected by what goes on when that particular student is a relatively passive observer and listener during the times when that teacher is addressing the group as a whole or (much more frequently) some other student.

This gradually changes with increasing grade level, and by junior high school, the teaching-learning situation has pretty much changed from a series of dyadic interactions occasionally broken by presentations to the entire group, to presentations to the entire group as the basic method of instruction, supplemented by follow up interactions with individuals (especially those who are having difficulty).

The dyadic coding system was used in the present study in order to replicate as much of the earlier work as possible. Several changes were introduced to take into account the fact that junior high students initiate more questions and comments during public recitations than elementary students do. We also added more detailed categories for teacher handling of specific kinds of student misbehavior, and we added the coding of time spent in various instructional activities. Even so, the coding system remained focused on dyadic interactions between the teacher and individual students. It did not allow low-inference coding of teacher behavior directed toward the class as a whole.

Unfortunately, we seem to have confirmed our fear that our research methods that have been successful in the early elementary grades are not as successful as the teaching-learning situation moves away from stress on basic skills and dyadic interactions. It still is useful even at the junior high level for math, where skill learning and relative homogeneity of curriculum and instructional methods is still observed. For English, though, the range of objectives addressed becomes too great to be handled by traditional end-of-the-year tests, and the range of instructional methods used becomes too great to be captured in a single coding system, even a very complex one of the sort that we have been using. These considerations call into question a method of trying to link classroom processes measured over the course of the school year to outcomes measured at the end of the year, no matter how complex the measurement of both processes and outcomes might be.

Here, it may be more appropriate (as well as much easier) to limit the scope of individual studies to particular aspects of teaching (presentation of new information to the class; conducting discussions; reviewing assignments), coding classroom events only during episodes related to the topic of study and using short term outcome criteria referenced to the teacher behavior being investigated rather than tests of general learning given at the end of the course or the school year. Linkage between classroom processes and scores on standardized achievement tests is desirable in many ways, especially because of the high face validity and credibility of the outcome criterion, but it just is not a reasonable expectation at the higher grade levels in subject matter areas where a great variety of objectives are pursued and instructional methods are used across schools and classrooms.

One of the reasons that the present research model (collecting process data across the length of the school year and relating them to end-of-the-year achievement test scores adjusted with covariables) was selected in the first place was that research on teaching prior to the 1970's had produced weak and contradictory results. The Coleman report and similar studies had raised serious questions about whether teachers made any significant difference in student learning at all, and reviews by Rosenshine (1971) and others pointed out that few teacher behavior variables received consistent support as correlates of student learning, and none of these correlated strongly and without exception. This led to an emphasis on long-term outcomes, especially standardized achievement tests at the end of an entire school year. This allowed investigators to argue the general point that teachers do in fact make a difference (as well as the more specific points involved in ascribing this difference to specific behavior).

This has changed in the 1970's. Issues have proliferated and the field is becoming recognizably more complex as it becomes more sophisticated, but even so, it is clear that some teachers consistently produce greater student learning than others, and that certain teacher behaviors have consistent positive or negative relationships with learning outcomes (Borich, 1977; Good, Biddle, & Brophy, 1975). The specific instructional methods that are appropriate vary with grade level and other context variables, as we have seen there, but is clear that learning outcomes are closely related to variables like the amount of direct instruction received (Rosenshine, Note 17) and the amount of time that students spend engaged in academic tasks (Rosenshine & Berliner, 1978). With hindsight, this seems obvious, but such data were necessary to refute the assertions, commonplace in recent years, that individual differences in teachers and/or in teacher behavior did not significantly affect student learning.

At this stage in the development of the field, such assertions have been refuted. We now recognize that teacher behavior does significantly affect student learning, and detailed information about process-outcome relationships is accumulating. Consequently, the need to include long-term outcomes is reduced. Furthermore, as attention shifts from gross general differences in teacher behavior to differences in the specifics of implementation of similar general patterns, long-term outcomes become less appropriate. There is less reason to believe that differences in subtle and situation specific teacher behavior can be shown to significantly influence long-term outcomes.

In the present study, for example, many classroom process variables concerned teacher behavior that occurred infrequently, such as teacher reactions to students who failed to respond to questions. Even though a few significant relationships with end-of-year achievement were observed, such variables can be studied more effectively using short-term outcomes like success in improving the student's response during that response opportunity and increases or decreases in the quality of the student's responses in the immediate future. Other possible short-term outcomes include student attention, signs of understanding or confusion during the lesson, quality of questions asked by students, and performance on follow up activities that required students to draw upon knowledge they had presumably gained during the lesson.

These research strategies should have more payoff than the strategy attempted here for linking the classroom processes to outcomes at higher grade levels and in subject matter areas where standardized tests are not representative in sampling the curriculum objectives actually taught. Junior high school English seems to fit this definition. Year-long data collection and use of standardized tests and end-of-year achievement criteria are useful in the early grades and even at the junior high level in math, although even here, short-term outcomes probably are more appropriate at this stage. Year-long studies with long-term outcomes have established that individual teachers and particular patterns of teacher behavior do make an important difference in student learning, but they may have reached a point of decreasing returns with respect to establishing new knowledge about teaching effectiveness.

The failure of the present study to find process variables which are consistently related to long-term outcomes in English classes, however, raises troublesome methodological and substantive issues that will not be easily resolved. The most important of those issues involves fragmentation and lack of consensus among researchers and among people who wish to improve the quality of teaching.

Research on teaching is valuable only if it results in the development of concepts which are applicable to real classrooms and which aid in the teaching of important skills and concepts. In the present study and others like it we have avoided the problem of defining "real classrooms" and "important skills and concepts" by using naturalistic samples of classrooms and standardized achievement tests. The naturalistic samples were presumed to be typical of similar classrooms throughout the country, and the achievement tests measured long-term outcomes which were generally conceded to be important. By using these methods we were able to do productive research on classroom processes in spite of the absence of a paradigm or general agreement among researchers and practioners as to which processes or short-term outcomes were significant.

The lack of a paradigm becomes a significant problem, however, for studies done on a smaller scale and involving short-term outcomes. The number of possible short-term outcomes that can be measured is immense, and there seems to be little consensus among researchers or practitioners as to which of those outcomes are important and which are not. Similarly,

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studies of subtle behaviors in specific situations often involve a prior commitment to a certain teaching model (such as direct instruction or individualized instruction). In the absence of a generally agreed on theory of teaching and learning, the possibility for fragmentation of effort is very great.

It may be that the greatest value of large-scale studies such as the present one will ultimately lie not so much in the isolation of important process-product relationships as in the guidance they provide for the design of more specific smaller scale studies. The present study, for example, is a source of descriptive data which can be used to decide which classroom formats and teaching behaviors occur often enough to be worthy of further study. The present study can also be useful in providing suggestions as to when short-term measures, such as student behavior or participation in class, are likely to be demonstrably associated with gains on more generally accepted long-term outcome measures such as achievement tests.

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